Hospital-Level Correlation Between Clinical and Service Quality Performance for Heart Failure Treatment

Sabina B. Gesell, Paul Alexander Clark, Deirdre E. Mylod, Robert J. Wolosin, Maxwell Drain, Peter Lanser, Melvin F. Hall

Abstract: A national cross-sectional study correlates the satisfaction ratings of heart failure patients (diagnosis related group 127) and the Centers for Medicare & Medicaid Services' process-based quality measures for heart failure treatment for 32 hospitals during the first and second quarters of 2004. Two of the four measures of clinical quality showed statistically significant, moderately strong, positive correlations with a global measure of satisfaction and with, respectively, 5 and 7 subscales of the 10 subscales of satisfaction under examination (Pearson's r ranged between .40 and .67, 2-tailed; $p < .05$). Findings demonstrate that quality need not be a zero-sum issue, with clinical quality and service quality competing for resources and attention.

Key Words
clinical and service excellence
heart failure
hospitals
inpatients
patient satisfaction
quality of healthcare

How does a hospital's clinical quality relate to its service quality? Do both measures indicate the global health of the organization? Is it possible for a hospital to have both high clinical quality and high service quality, or do resources devoted to clinical improvement detract from service excellence? Should a hospital devote resources to improvements in clinical quality (e.g., investment in new equipment), or to service excellence (e.g., a new training program)? As the hospital industry faces markedly increased public scrutiny, answers to such questions take on greater urgency.

As with all quality initiatives, quality improvement (QI) begins with quality measurement (Berwick, James, & Coye, 2003). Evidence of pervasive overuse, underuse, variation, and deadly errors within the healthcare industry (Committee on Quality of Health Care in America, Institute of Medicine [IOM], 2000; Schuster, McGlynn, & Brook, 1998) has provoked a swift revolution in national healthcare quality measurement policy and practice. Many of the quality measurement initiatives in healthcare have focused solely on clinical quality. The national healthcare quality agenda now entails (a) the measurement and public reporting of an array of risk-adjusted outcomes (e.g., mortality, readmission) and non-risk-adjusted processes (e.g., whether an acute myocardial infarction [AMI] patient received aspirin and beta-blockers within a certain amount of time), (b) the dissemination of clinical practice guidelines, and (c) the establishment of national improvement goals, all determined through evidence-based investigation (Leatherman, Hibbard, & McGlynn, 2003; McGlynn, 2003a, 2003b, 2003c; McGlynn, Cassel, Leatherman, DeCristofaro, & Smits, 2003; National Committee for Quality Assurance, 2003). For instance, the Centers for Medicare & Medicaid Services (CMS) is implementing a Hospital Quality Information Initiative (HQII) to publicly report hospital performance in 17 (soon to be 22) process-based measures of clinical quality (Clancy & Scully, 2003; CMS, 2003b; Stryer & Clancy, 2003). HQII measures were derived from research in which CMS developed and tested measures of outcomes (Cooper, Kohlmann, Michael, Haffer, & Stevic, 2001) and processes (Jencks et al., 2000; Jencks, Huff, & Cuerdon, 2003) to assess clinical quality among Medicare beneficiaries without the need for risk adjustment. For example, the clinical process measures used by CMS have been shown to have a direct relationship to clinical outcomes such as mortality.

HQII and the supporting studies alone do not provide a complete profile of healthcare quality. Improvements in the structure, processes, and outcomes of care require the integration of clinical and service quality measurements. The Institute of Medicine's *Crossing the Quality Chasm: A New Health System for the 21st Century* patient-centered care requirement remains notably absent from most reports of quality in healthcare (Committee on Quality of Health Care in America, IOM, 2001). Integrating patients' evaluations of their care with clinical measures

Journal for Healthcare Quality
Vol. 27, No. 6, pp. 33–44

of healthcare quality is receiving increasing national support (Cleary, 2003; Hibbard, 2003). Although CMS plans to complement HQII with a brief set of standard patient-survey questions called Hospital Consumer Assessment of Health Plans Survey (HCAHPS), the proposed voluntary national survey questions on patient perspectives is still in development (Clancy & Scully, 2003; CMS, 2003c; Stryer & Clancy, 2003). The most important purpose of patient satisfaction measurement is to evaluate quality of healthcare services from the patient's perspective. Patient satisfaction is considered an important outcome in healthcare and an indicator of technical and service quality (Donabedian, 1988; Kaldenberg, Mylod, & Drain, 2003). CMS and the Agency for Healthcare Research and Quality consider "patient satisfaction as one component of quality, on par with mortality, morbidity, and quality of life as components of a balanced score card" (CMS, 2003a). Although many authors have argued that distinctions between service quality and technical quality are not of practical importance, both factors are involved in service delivery and affect patients' evaluations and clinical outcomes (Kenagy, Berwick, & Shore, 1999; Press, 2002). The distinction between the two categories of measures is likely most salient to members of the public, who may feel more comfortable interpreting patient satisfaction outcomes than the outcome measures reported for clinical quality.

Although little research exists on the relationship between process-based measures of clinical quality and patient satisfaction with the care experience, the literature demonstrates a significant positive relationship between outcome measures of clinical quality and patient satisfaction. A comprehensive collection and evidence-based hierarchy of the published research lists 33 studies that link patients' satisfaction with their care experience to clinical quality and 14 studies that link patient satisfaction with compliance (Clark, Drain, & Malone, 2004). In their review, Clark and colleagues identify at least one study each that independently and positively relates patient satisfaction to one of the following clinical outcomes: clinical quality (e.g., $HbA1_c$ levels, cholesterol levels, fewer bed disability days), chronic disease control, compliance, drug complications, quality of life, emotional health status, mental health, physical functioning, physical health status, postsurgery complications, postsurgery recovery times, risk-adjusted mortality rates, unexpected mortality, and work effectiveness. Their review of the literature yielded only one study with mixed results and none with evidence against the relationship between patient satisfaction and clinical outcomes.

In a series of literature reviews, Wagner and colleagues (Wagner, Austin, Davis, Hindmarsh, Shaefer, & Bonomi, 2001; Wagner, Austin, & von Korff, 1996a, 1996b; Wagner, Davis, Schaefer, von Korff, & Austin, 1999) concluded that evidence-based clinical care and well-designed chronic disease self-management programs that are patient-centered simultaneously improve disease control, patient satisfaction, and compliance. Stewart (1995) reviewed the literature on effective physician-patient communication and health outcomes and found that the majority of randomized control trials (16 of 21) demonstrated that the quality of physician-patient communication affects patient satisfaction, rates of compliance, and health outcomes. The specific clinical outcomes affected positively by high-quality physician-patient communication were emotional health, symptom resolution, function, physiologic measures (i.e., blood pressure and blood sugar level), and pain control.

The current investigation examines the relationship between hospitals' adherence to CMS clinical process measures for heart failure treatment and their heart failure patients' perceptions of quality. Heart failure is an important clinical indicator because of its high mortality rates and substantial healthcare service utilization. Moreover, straightforward guidelines exist for the treatment of heart failure in the hospital, as does a national database of hospital-level adherence to these treatment guidelines. Thus, heart failure provides an excellent locus for the examination of this question.

Methods

Sample

This study was a retrospective database study, drawing upon data collected between the first and second quarters of 2004 and maintained in the Press Ganey National Inpatient Database and on the CMS Hospital Compare Web site.

Press Ganey, a vendor of satisfaction measurement and improvement services for the healthcare industry, collects and houses data for hospitals across the United States for the purposes of QI and benchmarking. The Press

Ganey National Inpatient Database includes 32% of the nation's acute care hospitals, 40% of the nation's acute care hospitals over 100 beds, and 63% of all university-based hospitals. Data from heart failure patients (coded by the participating hospitals with principal diagnosis related group [DRG] 127) who returned surveys within the first and second quarters of 2004 were extracted from the database because this time frame represented the most current data available on Hospital Compare at the time of the study. Respondent-level data were aggregated by hospital. Hospitals with a minimum of 30 satisfaction surveys were included in the analyses because 30 is the minimum sample size requirement of the firm to ensure reliable point estimates. An analysis of variance confirmed more between-hospital variation than within-hospital variation, $F(31, 1340) = 2.908$, $p < .001$, justifying aggregating patient scores to the hospital level.

Clinical quality data were extracted from the Hospital Compare Web site (www.hospitalcompare.hhs.gov). The data presented on this Web site are voluntarily submitted by short-term acute care hospitals and remote rural critical access hospitals. Beginning with discharges in 2004, eligible short-term acute care hospitals could elect to report quality data in order to receive Medicare incentive payments. Though reporting is voluntary, 4,200 hospitals were submitting their data at the time of the study. Thus the vast majority of hospitals have committed to participate in this public reporting initiative. Data on Hospital Compare is displayed for both the first and second quarters of 2004 for two of four measures (percentage of patients given angiotensin-converting enzyme [ACE] inhibitor for left-ventricular systolic dysfunction [LVSD], percentage of patients given assessment of left ventricular function [LVF]). For the other two measures (percentage of patients given adult smoking cessation advice or counseling, percentage of patients given discharge instructions), Hospital Compare displayed data only from the second quarter of 2004. The information available on Hospital Compare is hospital-level performance rates based on information taken from patient records. Hospitals with a minimum of 25 patients included in the clinical measures were included in the analyses because Hospital Compare advises that hospital scores based on fewer cases may not be reliable.

The satisfaction ratings of heart failure patients and the clinical process measures for heart failure treatment for 32 hospitals were linked and analyzed. Four data points with standardized scores in excess of |3.29| were identified as outliers (Tabachnick & Fidell, 1996) and excluded from analysis.

Demographic classification of hospitals was completed using the HCIA (2002) data set, purchased from another data services company, HCIA (www.hcia.com), a wholly owned subsidiary of Solucient, LLC. The sample of 32 hospitals differed significantly from the population of U.S. inpatient facilities on several variables: ownership, bed size, location, teaching status, and proportion of discharged patients who are Medicare beneficiaries. The sample hospitals were more likely to be not-for-profit, large, urban, and academic medical centers, with lower than average Medicare discharge rates (see **Table 1**). The sample did not differ from the population in Medicaid discharge rates.

An automated mailing methodology ensured that all patients selected through a hospital's sampling strategy received a survey, eliminating the possibility of selection bias.

Procedure

Patient satisfaction. A standardized mail-out/mail-back methodology was utilized to collect patient satisfaction data. Surveys were mailed to random samples of discharged patients continually throughout the year, aiding hospitals' ongoing performance improvement initiatives and reducing seasonal variation in the data. Surveys were mailed to patients' home addresses within 5 days of their hospital visit. Preaddressed stamped envelopes were included with the surveys so that patients could return the completed survey at no cost. An automated mailing methodology ensured that all patients selected through a hospital's sampling strategy received a survey, eliminating the possibility of selection bias. Completed surveys were returned to the research firm for coding and analysis. Response rates averaged 25%–30%, which is typical of well-designed single-wave inpatient satisfaction surveys mailed with a

Table 1. Comparison of Sample and Population Characteristics

	Sample (n = 32)		Population (N = 5,234)*†		Difference Test
	Mean	***SD***	**Mean**	***SD***	***p***
Bed size	458	221	165	178	<.05
Medicare %	36	12	44	16	<.05
Medicaid %	12	7	14	11	n.s.
Teaching	**Percentage**		**Percentage**		<.05
COTH	28		5		
Major	25		15		
Nonteaching	47		71		
Location					<.05
Rural	6		41		
Urban	94		48		
Ownership					<.05
Government	9		23		
Investor-owned	3		13		
Not-for-profit	88		51		

COTH = Council of Teaching Hospitals
*Data source: HCIA (2002)
†Population proportions do not sum to 100% because of missing data.

cover letter (Press, 2002) and higher than other "cold" direct-mail surveys sent without previous contact to the receiver because of the personal relevance the topic holds (Alreck & Settle, 1995; Kelley, Clark, Brown, & Sitzia, 2003).

Clinical quality. Hospitals generally collected their data retrospectively from administrative data and medical record documents. Although some hospitals gathered data concurrently by identifying patients in the population of interest, complete documentation requires the principal and other *International Classification of Diseases-9th Edition-Clinical Modification (ICD-9-CM)* diagnosis and procedure codes, which require retrospective data entry.

Measures

Patient satisfaction. The Press Ganey Inpatient Survey was used to collect the patient satisfaction data. The instrument's validity and reliability surpass accepted standards for sound scale construction and are described in detail elsewhere (Clark, Kaldenberg, Drain, & Wolosin, 2004; Gesell, Clark, & Williams, 2004). Cronbach's alpha for the subscales ranged from 0.84 to 0.95, and Cronbach's alpha for the entire instrument was 0.98.

The conceptual model underlying the survey is based on the patient's experience with the care received. Question and subscale order follow the patient's experience in the acute care setting, and the items on the questionnaire are written in the language of the patient. Events that occur (admission, meals, tests or treatments, discharge), personnel encountered (nurses, physicians, and technical staff), the physical surroundings (room and hospital), and the interpersonal communication during the stay are seen as important contributors to the patient's total experience and reflections of the quality of the medical care delivered and received.

The survey consists of 49 patient-centric questions that measure patient satisfaction with specific aspects of an inpatient visit. Items are worded in easily understood language, and the patient is asked to provide a numeric rating for each concept, such as "speed of the admission process." According to the Flesch-Kincaid Index, the questionnaire has a fifth- to sixth-grade reading level. Items are rated on a 5-point Likert-type scale with the following anchors: 1 = *very poor*, 2 = *poor*, 3 = *fair*, 4 = *good*, 5 = *very good*. The 5-point scale is transformed into a 100-point scale to ease data interpretation by a linear conversion: 1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100.

The items of the survey are arranged into 10 subscales, each representing a specific dimension of the care experience (admission, room, meals, nursing care, tests and treatments, physicians' care, treatment of visitors and family, discharge, personal issues, and overall assessment). Subscale scores are calculated by averaging across items within each survey subscale. In addition, an "overall satisfaction" composite score is calculated for each respondent by averaging across the subscale scores. The subscale and composite scores were used in the current study. Subscales have been validated through factor analysis with results published elsewhere (Kaldenberg, Mylod, & Drain, 2003).

Clinical quality. Hospital Compare currently shows 17 quality measures for heart failure, heart attack, and pneumonia treatment. This study analyzed all four of the quality measures for heart failure treatment (percentage of patients given ACE inhibitor for LVSD, percentage of patients given assessment of LVF, percentage of patients given adult smoking cessation advice or counseling, percentage of patients given discharge instructions). These measures are indicators of care that is effective in preventing or treating heart failure and are an important part of the patients' overall care (Jencks et al., 2000; Jencks et al., 2003).

The goal for all hospitals on each measure is 100%. Hospital performance rates are thought to give a good indication of how well hospitals provide appropriate care. The denominator is the sum of all eligible cases (as defined in the measure specifications) submitted to the Quality Improvement Organizations Clinical Data Warehouse for the reporting period. The numerator is the sum of all eligible cases submitted for the same reporting period where the recommended care was provided. For example, a hospital's performance on appropriately assessing LVF is computed as the number of heart failure patients with documentation in the hospital record that LVF was assessed before arrival, during hospitalization, or was planned for after discharge divided by the number of heart failure patients admitted to the hospital. Measures and rate calculations are described in more detail on www.hospitalcompare.hhs.gov.

Results

Two of the four clinical process measures (percentage of patients given assessment of LVF, percentage of patients given discharge instructions) showed statistically significant, moderately strong, positive correlations with a global measure of satisfaction and with, respectively, 5 and 7 subscales of the 10 subscales under examination (Pearson's r ranged between 0.40 and 0.67, 2-tailed; $p < .05$). Hospitals that comply with CMS process measures in their treatment of heart failure patients, as measured by percentage of patients given assessment of LVF and percentage of patients given discharge instructions, also achieve higher satisfaction ratings from their heart failure patients.

The other two clinical measures (percentage of patients given an ACE inhibitor for LVSD, percentage of patients given adult smoking cessation advice or counseling) showed no statistical relationship to patient satisfaction.

All correlations are shown in **Table 2**. Descriptive statistics for all measures are shown in **Table 3**. The significant linear relationships between overall patient satisfaction and heart failure clinical quality indicators are alternatively shown as scatterplots in **Figures 1 and 2.**

Discussion

Hospital levels of service quality vary with hospital levels of clinical quality (for two of the four clinical measures under examination), and the

Figure 1. Relationship Between Overall Patient Satisfaction and Percentage of Patients Given Assessment of Left Ventricular Function (N = 31, r = .5)

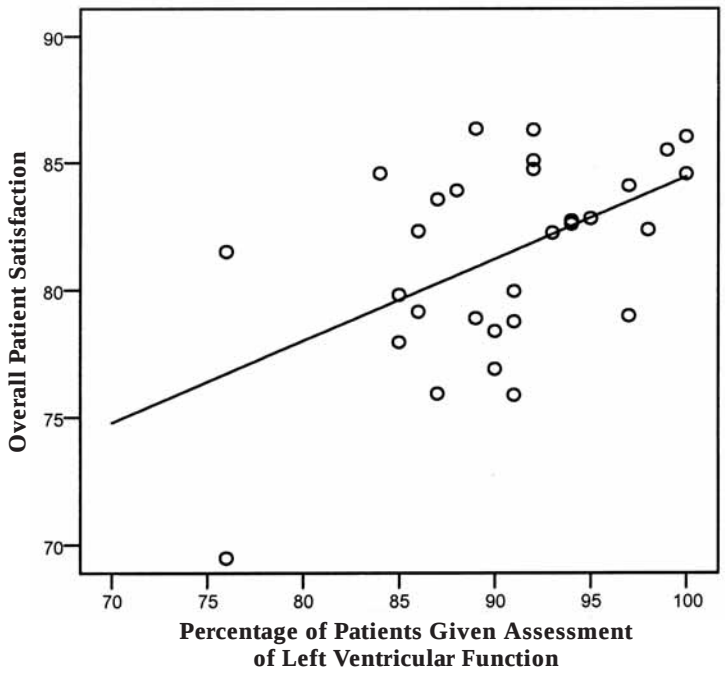

Figure 2. Relationship Between Overall Patient Satisfaction and Percentage of Patients Given Discharge Instructions (N = 26, r = .6)

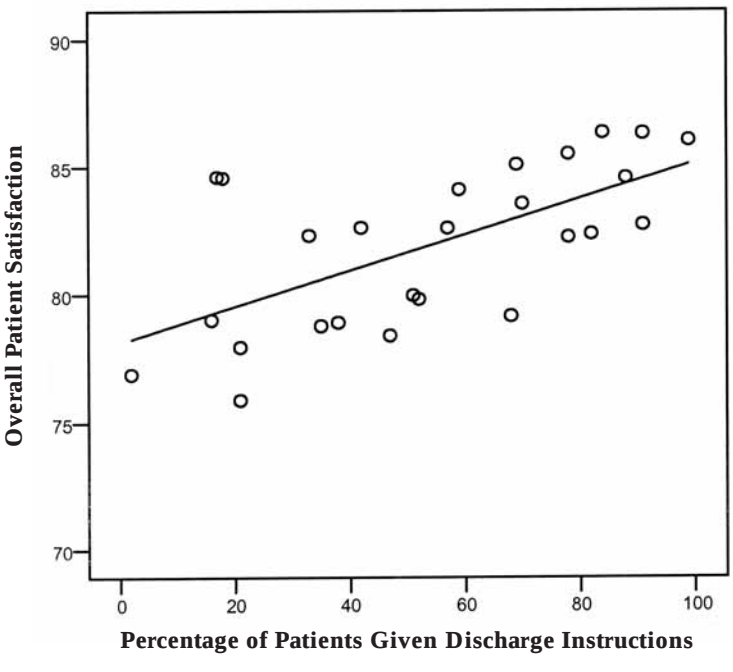

Table 2. Correlation Matrix of Satisfaction and Clinical Measures

		Percentage of Patients Given ACE Inhibitor for LVSD	Percentage of Patients Given Adult Smoking Cessation Advice or Counseling	Percentage of Patients Given Assessment of Left Ventricular Function	Percentage of Patients Given Discharge Instructions
Overall Satisfaction Composite	Pearson Correlation	.141	.114	**.506****	**.635****
	Sig. (2-tailed)	.443	.673	.004	.000
	N	32	16	31	26
Admission Subscale	Pearson Correlation	.061	.105	.307	.275
	Sig. (2-tailed)	.739	.699	.093	.174
	N	32	16	31	26
Room Subscale	Pearson Correlation	.038	–.034	.186	.368
	Sig. (2-tailed)	.838	.899	.315	.064
	N	32	16	31	26
Meals Subscale	Pearson Correlation	.187	.111	.314	**.497****
	Sig. (2-tailed)	.306	.681	.085	.010
	N	32	16	31	26
Nursing Care Subscale	Pearson Correlation	.297	.171	**.408***	**.624****
	Sig. (2-tailed)	.105	.527	.025	.001
	N	31	16	30	26
Tests Subscale	Pearson Correlation	.154	.118	**.428***	**.666****
	Sig. (2-tailed)	.400	.663	.016	.000
	N	32	16	31	26
Treatment of Visitors and Family Subscale	Pearson Correlation	.193	.054	**.495****	**.480***
	Sig. (2-tailed)	.289	.843	.005	.013
	N	32	16	31	26
Physician Care Subscale	Pearson Correlation	.194	–.130	**.527****	.259
	Sig. (2-tailed)	.288	.632	.002	.202
	N	32	16	31	26
Discharge Subscale	Pearson Correlation	.158	–.046	.233	**.421***
	Sig. (2-tailed)	.395	.866	.214	.032
	N	31	16	30	26
Personal Issues Subscale	Pearson Correlation	.152	.025	**.444***	**.455***
	Sig. (2-tailed)	.408	.926	.012	.020
	N	32	16	31	26
Overall Assessment Subscale	Pearson Correlation	.198	.139	.300	**.512****
	Sig. (2-tailed)	.286	.607	.107	.007
	N	31	16	30	26

Significant correlations are in **boldface.**
*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

hospitals that have better performance rates on CMS process measures for heart failure treatment tend to have higher levels of patient satisfaction from their heart failure patients. The failure to detect a relationship between patient satisfaction and two of the clinical guidelines may be explained by inadequate statistical power (<.10). The positive relationship between clinical quality and patient satisfaction is an important finding because it demonstrates that quality need not be a zero-sum issue, with clinical quality and service quality competing for resources and attention. Rather, an organization that embraces QI with the whole patient in mind can achieve both high quality of care and high levels of service to the patient.

The observed correspondence might be due to organizational effectiveness (i.e., technical quality and service quality may be inseparable processes in healthcare). When more formal national quality measurement and accountability systems are in place, the extent to which QI is a function of

Table 3. Descriptive Statistics for Satisfaction and Clinical Measures

	N	Min	Max	Mean	*SD*
Satisfaction Outcome Measure					
Overall Satisfaction Composite	32	69.5	86.3	81.5	3.8
Admission Subscale	32	70.2	87.2	80.7	4.1
Room Subscale	32	68.1	86.3	78.4	4.3
Meals Subscale	32	66.3	85.1	76.2	4.3
Nursing Care Subscale	31	77.0	93.0	86.0	4.0
Tests Subscale	32	72.7	87.6	82.4	3.6
Treatment of Visitors and Family Subscale	32	69.8	89.7	82.8	4.4
Physician Care Subscale	32	75.0	91.9	83.5	4.6
Discharge Subscale	31	70.9	86.6	80.6	3.6
Personal Issues Subscale	32	68.3	89.0	81.4	4.8
Overall Assessment Subscale	31	79.9	92.8	86.6	3.6
Clinical Process Measure					
Percentage of Patients Given ACE Inhibitor for LVSD	32	62	98	76.6	8.6
Percentage of Patients Given Adult Smoking Cessation Advice or Counseling	16	41	93	71.7	15.4
Percentage of Patients Given Assessment of Left Ventricular Function	31	76	100	90.6	6.0
Percentage of Patients Given Discharge Instructions	26	2	99	54.1	28.1

organizational competency, professional capacity, knowledge, skill, and motivation will be determinable (Berwick et al., 2003). Already, Bradley and colleagues have observed specific behaviors and characteristics of hospital senior leadership and management that considerably influence the success of clinical QI initiatives focused on these process-based measures (Bradley et al., 2001, 2003). Hospitals that effectively organize to excel in the delivery of clinical quality processes are likely to have the capacity to excel in delivery of service quality and vice versa. If these processes are designed well, performance improvement teams that focus on clinical and service excellence will find that synergies are available. For example, many of the CMS's sixth and seventh Scope of Work indicators are identical to the Core Measures indicators of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Having a performance improvement team working on the CMS and JCAHO process measures in tandem with patient satisfaction indicators will enable economies of scale.

It is interesting to note the patterns of significant and nonsignificant relationships found within this study of heart failure patients (see **Table 4**). The assessment of LVF was associated with 5 of the 10 subscales of the patient satisfaction measure as well as with the overall satisfaction indicator. The provision of discharge instructions was associated with 7 of the 10 subscales as well as with the overall satisfaction indicator. Many of the significant relationships were similar across the two clinical measures including the relationship with overall satisfaction, nursing care, tests and treatments, treatment of visitors and family, and personal issues. However, the assessment of LVF was also correlated with the patients' perception of physician care (the physician would be perceived by the patient as the person responsible for ordering such a test) and was not correlated with patient satisfaction with the discharge process. Unlike the assessment of LVF, the provision of discharge instructions was correlated with the meals subscale and the discharge subscale, but not with the physicians' care subscale. Discharge instructions may be more likely to be delivered by nursing staff or care coordinators than by physicians and may particularly include information about special diet and future dietary recommendations.

Percentage of patients given an ACE inhibitor for LVSD was not associated with any measure of patient perceptions of care and service. The distribution of a particular type of medication, although highly relevant from a clinical perspective, may escape the notice of patients. Patients have no reason to know the protocol for the appropriate choice of medication in response to

Table 4. Overview of Significant and Nonsignificant Relationships Between Clinical and Satisfaction Measures

Clinical Quality Measure for Heart Failure Treatment	Clinical Quality Measure Related to	Clinical Quality Measure Not Related to
Percentage of patients given LVF assessment	Overall satisfaction measure Nursing Care Subscale Tests Subscale Treatment of Visitors and Family Subscale Physician Care Subscale **Personal Issues Subscale** (e.g., pain control, emotional support, response to complaints)	Admission Subscale Room Subscale Meals Subscale Discharge Subscale Overall Assessment Subscale
Percentage of patients given discharge instructions	Overall Satisfaction Measure **Meals Subscale** Nursing Care Subscale Tests Subscale Treatment of Visitors and Family Subscale **Discharge Subscale** Personal Issues Subscale (e.g., pain control, emotional support, response to complaints) Overall Assessment Subscale (e.g., coordination of care, likelihood to recommend)	Admission Subscale Room Subscale Physician Care Subscale
Percentage of patients given ACE inhibitor for LVSD	No significant relationships found	
Percentage of patients given adult smoking cessation advice or counseling	No significant relationships found	

Note: **Boldface** items are significantly associated with only one clinical quality measure.

diagnosis of LVSD, thus there would be no reason to expect this measure to vary with patients' assessment of care. Nevertheless, the assessment of LVF as a testing procedure is more likely to be salient and memorable to a patient. Patients are told that this activity will happen and then experience the test itself. Such experiences, especially when coupled with education regarding why the test is needed, may contribute to the patient's appreciation of the clinical quality of care provided during the hospital stay and thus may vary with their satisfaction with the inpatient experience.

The percentage of patients given adult smoking cessation advice or counseling did not have significant relationships with any aspect of patient satisfaction with the hospital stay. The very receipt of such counseling, although necessary and important, can be disquieting to patients. It reminds them that they personally are contributing negatively to their health and may elicit memories of failed attempts to stop smoking. Such conversations require both tact and persuasion on the part of the healthcare provider. But even the most sensitive delivery of this information may be uncomfortable for patients. It is not surprising, then, that this clinical indicator does not have significant positive relationships with the way patients view their care experience.

Future Research

Although 4,200 hospitals agreed to participate in the hospital quality initiative, not all had submitted data at the time of this analysis. When more facility-level data become publicly available through the HQII and HCAHPS online postings, a study of larger scale will be possible.

Federal researchers interested in widespread use of a standardized instrument for measuring patient satisfaction have expressed curiosity about exploring the covariation of satisfaction

scores with clinical indicators of hospital performance, such as those required by CMS in the seventh Scope of Work for quality improvement organizations (*Federal Register*, July 31, 2003).

Future investigations of the link between clinical and service excellence segmented by diagnosis seem promising, given the current findings and recent research (Gesell & Wolosin, 2004) that identifies differences in patient satisfaction depending on clinical condition (e.g., satisfaction with coordination of care is significantly higher among AMI patients than among pneumonia patients). Combining clinical and service excellence indicators at the diagnosis level would enable hospitals to focus on targeted performance improvement initiatives (e.g., ensuring that the appropriate processes take place for AMI patients to the satisfaction of the care providers as well as to the satisfaction of the patients). Consistent understanding of hospital quality at the diagnosis level will contribute to hospitals' ability to differentiate themselves at the service level. Such differentiation will assist consumers in understanding and making healthcare choices and will, through healthy competition, drive the U.S. healthcare industry to increase quality and reduce costs to consumers (Porter & Olmsted Teisberg, 2004).

Limitations

The Press Ganey Database was selected for analysis because it represents the nation's largest database of inpatient satisfaction. The database, however, does not include patient satisfaction data from every hospital and heart failure patient in the nation and therefore may contain some degree of selection bias. Hospitals that hire survey research firms may be—and probably are—different from those that do not (e.g., they may emphasize continuous QI as an organizational goal).

Hospital participation in Press Ganey's continuous performance measurement is voluntary and requires payment of a fee, which suggests that poorly performing hospitals, or those that choose not to dedicate funds to satisfaction measurement, may exclude themselves from the national database. The effects of self-selection are likely lessened in this study by the fact that individual hospital scores are kept confidential. By contrast, the effects of self-selection are likely to be more pronounced in surveying situations (e.g., Patients' Evaluation of Performance in California or Cleveland Health Quality Choice) where performance evaluation is voluntary and results are publicly reported (Benko, 2003; Neuhauser & Harper, 2002). As noted previously, the sample of 32 hospitals in the current study was more likely to be not-for-profit, large, urban, and academic medical centers with lower-than-average Medicare discharge rates. Each of these characteristics is associated with lower-than-average satisfaction scores. Thus, the range of satisfaction scores in this study may be limited and also have a lower average than the national norm. The presence of significant correlations within a sample expected to have a curtailed range of scores may indicate stronger relationships that could be identified with a full spectrum of performers. In the current study, Council of Teaching Hospitals (COTH) and major teaching hospitals were overrepresented because these hospitals are more likely to submit DRG codes to Press Ganey than are other Press Ganey clients, which likely demonstrates their propensity to want to conduct extensive analyses of their satisfaction data. Previous research has demonstrated that teaching status does not have a significant relationship with normative satisfaction scores after hospital bed size has been considered. Thus, the higher rate of inclusion of teaching facilities in this study would not be expected to have an effect on the representation of normative patterns for satisfaction data.

Because no statistical basis exists for establishing an "acceptable" response rate (Babbie, 1990), the issue of nonresponse bias must be addressed. Patients who respond to patient satisfaction surveys may differ from those who do not. A previous study of nonresponse bias in the Press Ganey Inpatient Database (Kaldenberg 1998a, 1998b) found that some groups were more likely to return a completed patient satisfaction survey than others, mirroring other studies on response patterns to mailed surveys. Females were more likely to respond than males, Caucasians were more likely to respond than other ethnic groups, married individuals were more likely to respond than singles, the youngest and oldest patients were less likely to respond than other age groups, and patients with Medicaid coverage or no insurance were less likely to respond than patients with other types of insurance. However, overall patient satisfaction was not statistically different among categories of sex, marital status, age,

or type of insurance, although it was different among categories of ethnicity (Asian Americans were the least satisfied group, and Hispanic Americans the most satisfied). On the basis of these findings, the composite overall satisfaction scores in the current study were likely not biased by lower response rates among men, single patients, and the very old but were likely biased by lower response rates from non-Caucasian populations. The opinions of non-Caucasian patients in hospitals with high non-Caucasian populations were likely underrepresented, so the reported level of satisfaction may not be representative of the entire patient population and the correlation between service quality and clinical quality may be different. In hospitals where non-Caucasians do not represent a sizable proportion of the patient population, the satisfaction score is unlikely to be biased, and the correlations are likely to be accurate.

Two steps were taken to mitigate nonresponse bias. The first was to ensure that all eligible patients had an equal probability of being selected for the satisfaction survey and that random sampling was used. The second step to reduce measurement error was to increase the amount of data analyzed. Smaller samples are more likely to be different from the population than larger ones. As a result, smaller samples have more measurement error and lower reliability.

The CMS quality indicators are not true outcome measures but are process measures. Indicators such as whether a patient was given smoking cessation advice track how well a hospital manages processes. After the patient leaves the hospital, there is little chance of knowing whether the patient followed the advice. Process measures were selected, in part at least, because of the lack of a need for risk adjustment among process measures. Risk adjustment is also not necessary for patient satisfaction results because patient characteristics typically explain little of the variation among hospital patient satisfaction scores (Barr & Banks, 2002). Nevertheless, the process measures monitored by CMS and patient satisfaction measures, when combined, give a detailed look at the episode of care from the hospital's view (process measures) as well as from the patient's perspective.

Caution should be taken in interpreting the results presented here. Group-level correlations, such as those performed here, do not reflect causation at the individual level. The data in the present study do not permit the conclusion that individual patients who receive excellent service also experience excellent technical care, or vice versa. Similarly, clinical process measures and patient satisfaction measures were not available for all of the same patients. Using clinical and satisfaction data from the same patients in the future will eliminate the "noise," or random variation, inherent in unmatched data.

Conclusions

Notwithstanding these shortcomings, the data were drawn from the best available sources. If the detected relationship between clinical process measures and service quality holds with future studies, then service will have to be considered a component of care rather than a phenomenon distinct from and merely ancillary to technical care; and technical care, coupled with the manner in which that care is delivered (i.e., the extent to which the whole person is treated) will define quality. Healthcare quality professionals should be heartened by this study because their efforts contribute to both clinical and service quality. It is indeed possible for hospitals to excel in both areas of performance simultaneously.

References

Alreck, P. L., & Settle, R. B. (1995). *The survey research handbook: Guidelines and strategies for conducting a survey* (2nd ed.). Chicago, IL: Irwin.

Babbie, E. (1990). *Survey research methods* (2nd ed.). Belmont, CA: Ed Wadsworth Publishing Company.

Barr, J. K., & Banks, S. (2002). *Public reporting of hospital patient satisfaction: A review of survey methods and statistical approaches.* Middletown, CT: Rhode Island Department of Health. Retrieved August 30, 2005, from www.health.ri.gov/chic/performance/quality/quality14.pdf

Benko, L. B. (2003). Voluntary problems. While California's PEP-C patient survey gains momentum, hospitals often aren't willing to participate in the quality gauge. *Modern Healthcare, 33*(25), 6–7, 16, 11.

Berwick, D. M., James, B., & Coye, M. J. (2003). Connections between quality measurement and improvement. *Medical Care, 41*(Suppl 1), I30–I38.

Bradley, E. H., Holmboe, E. S., Mattera, J. A., Roumanis, S. A., Radford, M. J., & Krumholz, H. M. (2001). A qualitative study of increasing beta-blocker use after myocardial infarction: Why do some hospitals succeed? *Journal of the American Medical Association, 285*(20), 2604–2611.

Bradley, E. H., Holmboe, E. S., Mattera, J. A., Roumanis, S. A., Radford, M. J., & Krumholz, H. M. (2003). The roles of senior management in quality improvement efforts: What are the key components? *Journal of Healthcare Management, 48*(1), 15–28; discussion 29.

Centers for Medicare & Medicaid Services. (2003a). *End-stage renal disease CAHPS® technical experts panel.* Retrieved August 29, 2003, from http://www.ahrq.gov/qual/cahps/esrdcahps.htm

Centers for Medicare & Medicaid Services. (2003b). *Hospital quality initiative.* Retrieved June 14, 2003, from http://cms.hhs.gov/quality/hospital/

Centers for Medicare & Medicaid Services. (2003c). *Overview of Hospital CAHPS* (HCAHPS). Retrieved June 12, 2003, from http://cms.hhs.gov/quality/hospital/HCAHPSqanda3.pdf

Centers for Medicare & Medicaid Services. (2003e). *Quality improvement organizations (QIOs): Statement of work.* Retrieved August 25, 2003, from http://cms.hhs.gov/qio/2.asp

Clancy, C. M., & Scully, T. (2003). A call to excellence. *Health Affairs (Millwood), 22*(2), 113–115.

Clark, P. A., Drain, M., & Malone, M. P. (2004). *Return on investment in satisfaction measurement and improvement.* Retrieved July 19, 2005, from www.pressganey.com/files/roi1.pdf

Clark, P. A., Kaldenberg, D. O., Drain, M., & Wolosin, R. (2004). Elderly inpatients' priorities for acute care service quality. *International Journal of Healthcare Quality Assurance, 17*(2), 92–104.

Cleary, P. D. (2003). A hospitalization from hell: A patient's perspective on quality. *Annals of Internal Medicine, 138*(1), 33–39.

Committee on Quality of Health Care in America, Institute of Medicine. (2000). *To err is human: Building a safer health system* (L.T. Kohn, J.M. Corrigan, & M.S. Donaldson. Eds.). Washington, DC: National Academies Press.

Committee on Quality of Health Care in America, Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century.* (J. M. Corrigan, M. S. Donaldson, L. T. Kohn, S. K. MaGuire, & K. C. Pike, Eds.). Washington, DC: National Academies Press.

Cooper, J. K., Kohlmann, T., Michael, J. A., Haffer, S. C., & Stevic, M. (2001). Health outcomes. New quality measure for Medicare. *International Journal for Quality in Healthcare, 13*(1), 9–16.

Donabedian, A. (1988). The quality of care. How can it be assessed? *Journal of the American Medical Association, 260*(12), 1743–1748.

Federal Register, 68(July 31, 2003), 44951–44953.

Gesell, S. B., Clark, P. A., & Williams, A. (2004). Inpatient heart failure treatment from the patient's perspective. *Quality Management in Healthcare, 13*(3), 154–165.

Gesell, S. B., & Wolosin, R. J. (2004). Inpatients' ratings of care in five common clinical conditions. *Quality Management in Healthcare, 13*(4), 222–227.

HCIA. (2002). *Profiles of U.S. hospitals.* Baltimore: Author.

Hibbard, J. H. (2003). Engaging healthcare consumers to improve the quality of care. *Medical Care, 41*(Suppl 1), I61–I70.

Jencks, S. F., Cuerdon, T., Burwen, D. R., Fleming, B., Houck, P. M., Kussmaul, A. E., et al. (2000). Quality of medical care delivered to Medicare beneficiaries: A profile at state and national levels. *Journal of the American Medical Association, 284*(13), 1670–1676.

Jencks, S. F., Huff, E. D., & Cuerdon, T. (2003). Change in the quality of care delivered to Medicare beneficiaries, 1998–1999 to 2000–2001. *Journal of the American Medical Association, 289*(3), 305–312.

Kaldenberg, D. O. (1998a, March/April). Results from the Press, Ganey response study (Part 1). *The Satisfaction Monitor,* pp. 4, 5, 12.

Kaldenberg, D. O. (1998b, May/June). Results from the Press, Ganey response study (Part 2). *The Satisfaction Monitor,* pp. 5–7, 10.

Kaldenberg, D. O., Mylod, D. E., & Drain, M. D. (2003). Patient-derived information: Satisfaction with care in acute and post-acute care environments. In N. Pine (Ed.), *Measuring and managing healthcare quality* (pp. 4:69–4:89). New York: Aspen Publishers.

Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good practice in the conduct and reporting of survey research. *International Journal for Quality in Healthcare, 15*(3), 261–266.

Kenagy, J. W., Berwick, D. M., & Shore, M. F. (1999). Service quality in healthcare. *Journal of the American Medical Association, 281*(7), 661–665.

Leatherman, S. T., Hibbard, J. H., & McGlynn, E. A. (2003). A research agenda to advance quality measurement and improvement. *Medical Care, 41*(Suppl 1), I80–I86.

McGlynn, E. A. (2003a). An evidence-based national quality measurement and reporting system. *Medical Care, 41*(Suppl 1), I8–I15.

McGlynn, E. A. (2003b). Introduction and overview of the conceptual framework for a national quality measurement and reporting system. *Medical Care, 41*(Suppl 1), I1–I7.

McGlynn, E. A. (2003c). Selecting common measures of quality and system performance. *Medical Care, 41*(Suppl 1), I39–I47.

McGlynn, E. A., Cassel, C. K., Leatherman, S. T., DeCristofaro, A., & Smits, H. L. (2003). Establishing national goals for quality improvement. *Medical Care, 41*(Suppl 1), I16–I29.

National Committee for Quality Assurance (2003). *Health Plan Employer Data and Information Set (HEDIS).* Retrieved June 12, 2003, from http://www.ncga.org/Programs/HEDIS/

Neuhauser, D., & Harper, D. L. (2002). Too good to last: Did Cleveland Health Quality Choice leave a legacy and lessons to be learned? *Quality and Safety in Healthcare, 11*(2), 202–203.

Porter, M. E., & Olmsted Teisberg, E. (2004). Redefining competition in healthcare. *Harvard Business Review (HBR OnPoint Enhanced Edition),* 3–22.

Press, I. (2002). *Patient Satisfaction: Defining, measuring, and improving the experience of care.* Chicago: Health Administration Press.

Schuster, M. A., McGlynn, E. A., & Brook, R. H. (1998). How good is the quality of healthcare in the United States? *Milbank Quarterly, 76*(4), 509, 517–563.

Stewart, M. A. (1995). Effective physician-patient communication and health outcomes: A review. *Canadian Medical Association Journal, 152*(9), 1423–1433.

Stryer, D., & Clancy, C. (2003). Boosting performance measure for measure. *British Medical Journal, 326*(7402), 1278–1279.

Tabachnik, B. G., & Fidell, L. S. (1996). *Using multivariate statistics.* New York: HarperCollins College Publishers.

Wagner, E. H., Austin, B. T., Davis, C., Hindmarsh, M., Shaefer, J., & Bonomi, A. (2001). Improving chronic illness care: Translating evidence into action. *Health Affairs (Millwood), 20*(6), 64–78.

Wagner, E. H., Austin, B. T., & von Korff, M. (1996a). Improving outcomes in chronic illness. *Managed Care Quarterly, 4*(2), 12–25.

Wagner, E. H., Austin, B. T., & von Korff, M. (1996b). Organizing care for patients with chronic illness. *Milbank Quarterly, 74*(4), 511–544.

Wagner, E. H., Davis, C., Schaefer, J., von Korff, M., & Austin, B. (1999). A survey of leading chronic disease management programs: Are they consistent with the literature? *Managed Care Quarterly, 7*(3), 56–66.

Acknowledgments

The authors thank Debra Notestine and Jessica Langager of Press Ganey Associates, who assisted with data acquisition and management, and also three anonymous reviewers for their helpful feedback on an earlier version of this article.

Authors' Biographies

Sabina B. Gesell, PhD, is a senior research associate with Press Ganey Associates, Inc. A social psychologist, she has extensive training in measurement, survey design, and data analysis.

Paul Alexander Clark, MPA, is senior knowledge manager with Press Ganey Associates, Inc. He directs Press Ganey's knowledge management strategies, conducting quantitative and qualitative research to determine best practices for improving patient, employee, and physician satisfaction in healthcare.

Deirdre E. Mylod, PhD, is director of research and development/public policy at Press Ganey Associates, Inc. She received her PhD in developmental psychology from the University of Notre Dame.

Robert J. Wolosin, PhD, is a research product manager in the research and development department of Press Ganey Associates, Inc. He was educated at the University of Chicago and the University of Michigan.

Maxwell Drain, MA, is director of marketing and communications at Press Ganey Associates, Inc. He is a cognitive psychologist with extensive training in statistics, research methodology, and data analysis.

Peter Lanser, MS CHE CPHQ, is vice president of new product deployment at Press Ganey Associates, Inc. Prior to joining Press Ganey, he was the regional director of quality management for a seven-hospital system.

Melvin F. Hall, PhD, is president and chief executive officer of Press Ganey Associates, Inc. His book The Goal Is to Win *was published by Praeger in 1995.*