Hospital Cost and Efficiency: Do Hospital Size and Ownership Type Really Matter?

Coyne, Joseph S, DrPH; Richards, Michael Thomas; Short, Robert, PhD; Shultz, Kim; Singh, Sher G; et al.
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Abstract

The primary research question this study addresses is whether size and ownership type make a difference in the efficiency and cost results of hospitals in Washington State. A further question is on what factors might explain such differences. The data source is the hospital financial data reports Washington hospitals submit to the Washington Department of Health. The sample was restricted to not-for-profit and government-owned hospitals, given that these ownership types are predominant in Washington State, and there are only two investor-owned hospitals. The measures of efficiency and cost represent the generally accepted financial indicators derived from the healthcare financial management literature. These findings deserve further study on a regional or national level. A more scientific study of the efficiency and cost of hospitals by size and ownership type would be important to control for case mix, scope of services, and payer mix.

Full text

Headnote
EXECUTIVE SUMMARY

The primary research question this study addresses is, do size and ownership type make a difference in the efficiency and cost results of hospitals in Washington State? A further question is, what factors might explain such differences? The data source is the hospital financial data reports Washington hospitals submit to the Washington Department of Health. The sample was restricted to not-for-profit and governmentowned hospitals, given that these ownership types are predominant in Washington State, and there are only two investor-owned hospitals.

The measures of efficiency and cost represent the generally accepted financial indicators derived from the healthcare financial management literature. Cost and efficiency in these hospitals are analyzed using five efficiency ratios and five cost measures. The results are significant for five of the ten measures studied. Measured by occupancy percentage, small and large not-for-profit hospitals appear to achieve higher efficiency levels than government-owned hospitals do, but the larger hospitals of both ownership types report greater efficiency than that achieved by smaller hospitals. In terms of costs, small, not-for-profit hospitals report comparable costs to those of the largest hospitals, likely because 70 percent of the small not-for-profits are critical access hospitals.

These findings deserve further study on a regional or national level. A more scientific study of the efficiency and cost of hospitals by size and ownership type would be important to control for case mix, scope of services, and payer mix. Such studies can generate important findings about the relationship of hospital size and ownership type to efficiency and cost. Conducted on a national level, such studies would provide policymakers with the empirical data they need to make decisions regarding the types of hospitals to encourage or discourage in the future.

Hospital size has long been an area of discussion and debate in the U.S. healthcare industry. Questions have consistently focused on cost management or efficiency in large versus small hospitals. A persistent question among researchers is whether efficiencies are associated with larger facilities through economies of scale, or if there are alternate scenarios that play a significant part in hospital cost and efficiency.

PRIOR STUDIES

Researchers have used a wide variety of performance measures to compare hospital performance by organization size. In an earlier study, Coyne (1982) examined performance differences between system and independent hospitals using two cost measures (cost per case and payroll per patient day) and two efficiency measures (admissions per bed and full-time equivalents [FTEs] per occupied bed). Griffith, Alexander, and Jelinek (2002) examined cash flow, asset turnover, mortality, complications, length of inpatient stay, cost per case, occupancy, change in occupancy, and percent of revenue from outpatient care. When considering the content validity, reliability, sensitivity, and independence of all nine variables, the authors found that all measures except the two occupancy measures are good gauges of hospital performance. Pink and colleagues (2006), with a technical advisory group, created a financial indicators report specifically for critical access hospitals (CAHs). It includes 20 ratios found to be useful by the chief financial officers of CAHs for measuring profitability, liquidity, revenue, cost, and utilization. Griffith and colleagues (2006) analyzed Medicare data from more than 2,500 hospitals for a five-year period ending in 2003 that showed only a few of their nine measures exhibited signs of improvement, with most indicating volatility or only modest improvements.

Prior hospital performance research findings have been inconclusive in regard to hospital size, such that further study is needed. Yafchak (2000) examined the possibility that hospitals gain economies of scale as size increases. He found that prior to 1994 there were diseconomies of scale in nonteaching hospitals, and that from 1989 to 1997 there were economies of scale, overall, in larger hospitals. Ozcan and Luke (1993) found that hospital ownership and percentage of Medicare were the factors most associated with hospital efficiency, and facility size was consistently and positively related to efficiency due to economies of scale.

This article analyzes the cost and efficiency by size of not-for-profit and government-owned hospitals in the state of Washington. Five efficiency ratios and five cost measures were used. The primary research question is, do size and ownership type make a difference in the efficiency and cost results of hospitals in Washington state? A further question addressed is, what factors might explain the results of this analysis and provide some recommendations for managerial policies and practices in hospitals?

METHODS

Measures and Data

The measures of efficiency and cost represent the generally accepted financial indicators derived from the healthcare financial management literature. The data source is the financial reports hospitals submit to the Washington Department of Health. The sample was restricted to not-for-profit and government-owned hospitals, given that these are the predominant ownership types in Washington State, and there are only two investor-owned hospitals (see Table 1).

The study sample accounts for 98 percent of the hospitals in the state. The study uses three size categories: small (1-40 beds), medium (41-150 beds), and large (151 or more beds). These size categories were chosen because of the relatively even distribution of hospitals across the three. A national data set might benefit from more size categories, particularly for the larger facilities. In Washington State, there are only 27 hospitals wim more than 150 beds, 35 small and 34 medium-sized hospitals; further, there is an insufficient sample of facilities in excess of 200 beds. Indeed, in considering statistical power for comparative testing purposes, additional size categories cannot be justified. Given cost-based reimbursement for the small size category of hospitals, special consideration of the CAH is provided in the Discussion section.

The industry averages are represented by the median values for the year 2004 and for the Far West Region, to account for regional variations. As noted in Table 2, the industry averages are derived from the 2006 Almanac of

Hospital Financial and Operating Indicators compiled by Ingenix (Parkinson 2006).

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TABLE 1Study Sample Size

Efficiency indicators. The five efficiency indicators in this study are frequently used as measures of hospital performance. It is important to note that the occupancy percentage is based on the available beds and not on the licensed beds (see Table 2).

Cost indicators. The five cost indicators in this study are frequently used as measures of hospital performance. Three of the five cost indicators are adjusted to isolate admissions, discharges, and patient days associated with acute care activity by excluding skilled nursing facility (SNF) and swing beds in the study hospitals.

All measures of cost and efficiency are the mean values for the reporting year 2005. The mean values represent die average for each given size and ownership category.

Histograms were used to examine the distributions of the dependent variables. Two variables (cost per adjusted patient day and cost per adjusted admission) are skewed in their distribution and have been logarithmically transformed to create a more symmetrical distribution and therefore allow a fair statistical test.

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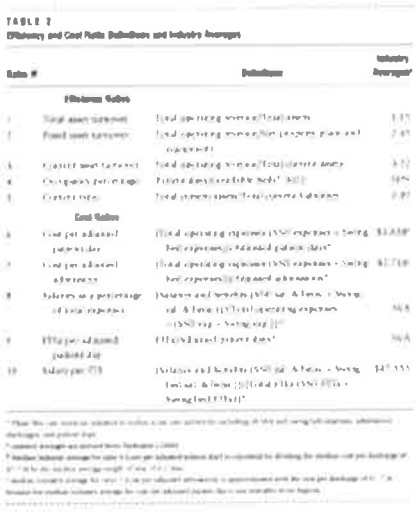

TABLE 2Efficiency and Cost Ratio Definitions and Industry Averages

Data were tested for differences between hospital sizes (small, medium, and large), for differences between ownership type (not-for-profit versus government-owned), and for differences due to the interaction between hospital size and ownership type using a two-way analysis of variance (ANOVA). SPSS 15.0 for Windows was the statistical package used for conducting the ANOVA tests. Post hoc comparisons of means were examined using Scheffe's method. Results were considered statistically significant when the probability value was less than 5 percent.

RESULTS

The five key results are as follows:

* Current asset turnover results show that size matters but ownership type (by itself) does not in that this measure of efficiency is significantly lower ($p < 0.001$) in the small hospitals than in the medium and large hospitals for both ownership types.

* Occupancy percentage results show that size and ownership type matter in that this measure of efficiency is highly significant for the main effects of size and ownership type and their interaction.

* Cost per adjusted patient day results show that hospital bed size matters but ownership type does not in that this cost measure is significantly higher in large hospitals than in mediumsized hospitals (Scheffe's $p = 0.031$).

* FTEs per adjusted patient day results show that size does not matter but ownership type does in that FTEs are higher among government hospitals than among not-for-profit hospitals, irrespective of hospital size, with marginal significance ($p = 0.047$).

* Salary per FTE results show that hospital size and ownership type matter in that this cost measure is higher in the not-for-profit hospitals than in the government hospitals $p = 0.015$) and higher in the larger hospitals than in the

small and medium-sized hospitals (p = 0.027).

The two-way ANOVA p-values are presented for bed size, ownership, and the interaction of bed size and ownership (see Table 3). Of the ten ratios that include two efficiency results and three cost results, five are statistically significant, with a probability value less than five percent.

More specifically, two of the five efficiency ratios show significant results, including current asset turnover (Ratio 3) and occupancy percentage (Ratio 4). Further, three of the five cost ratios show significant results, including cost per adjusted patient pay (Ratio 6), FTEs per adjusted patient day (Ratio 9), and salary per FTE (Ratio 10).

Current Asset Turnover (Ratio 3)

The results show that size matters but ownership type by itself does not in that this measure of efficiency is significantly lower (p < 0.001) in the small hospitals than in the medium and large hospitals for both ownership types (see Figure 1). The interaction between ownership type and bed size is also significant (p = 0.024), which means that not only does size by itself make a difference with this efficiency measure but so does size in combination with ownership type. The small not-for-profit hospitals had the lowest current asset turnover of 2.7, compared to the industry median value of 3.72, while the medium-sized not-for-profit hospitals had the highest current asset turnover of 5.0. Government-owned hospitals reported current asset turnover results approximating the industry average, from 3.5 to 4.1 for the three bed-size categories.

Occupancy Percentage (Ratio 4)

The results show that size and ownership type matter in that this measure of efficiency is highly significant for the main effects of size and ownership type and their interaction (see Table 3). This means that not only are bed size and ownership type significant individually, but also that the difference in occupancy percentage across hospital size categories depends on ownership type. Not-for-profit hospitals generally report higher occupancy rates, with a range of 49 percent for medium-sized to 62 percent for small and large hospitals, as compared with government-owned hospitals, which show a range of 26 percent for small hospitals to 69 percent for large hospitals (see Figure 2), as compared to the industry average of 50 percent.

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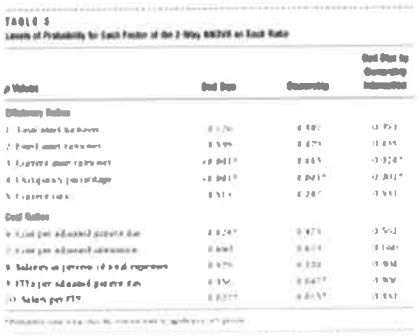

TABLE 3Levels of Probability for Each Factor of the 2-Way ANOVA on Each Ratio

In general, the large hospitals report higher occupancy rates than the small and medium-sized hospitals (p < 0.001 [by Scheffe] in both cases). Occupancy percentages are comparable between the two ownership types among larger hospitals, with large governmentowned hospitals reporting 69 percent occupancy rates and large not-for-profit hospitals reporting 62 percent, as compared to the industry average of 50 percent. Indeed, the most notable exception to these general patterns is small not-for-profit hospitals, which report a relatively high average occupancy rate of 62 percent, the same as the large not-for-profit hospitals, supporting the U-shaped curve. This is contrary to Halpern and colleagues' (2006) finding that small hospitals typically have a lower occupancy percentage than large hospitals.

Cost per Adjusted Patient Day (Ratio 6)

The results show that hospital size matters but ownership type does not in that this cost measure is lowest for the medium-sized ($2,081 for not-for-profit and $1,826 for government) hospitals, followed by small ($3,297 for not-forprofit and $2,504 for government) and large ($2,426 for not-for-profit and $2,865 for government) hospitals (p = 0.024). Post hoc comparisons show mat only the difference between the medium-sized and the large hospitals is

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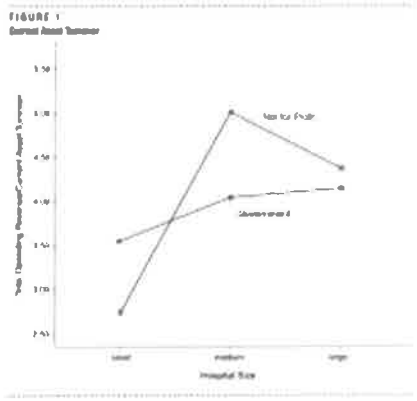

FIGURE 1Current Asset Turnover

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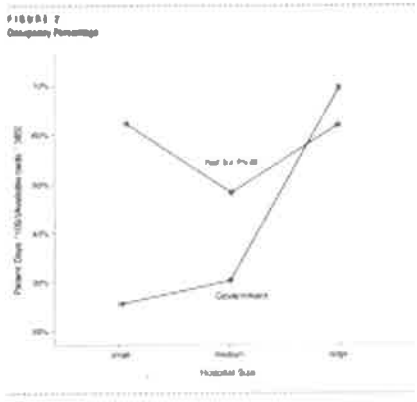

FIGURE 2Occupancy Percentage

statistically significant (p = 0.031 using Scheffe's test). There are no detectable differences between me small and medium or small and large hospitals (see Figure 3).

FTEs per Adjusted Patient Day (Ratio 9)

The results show that size does not matter but ownership type does in that FTEs are higher among government hospitals than among not-for-profit hospitals, irrespective of the hospital size (see Figure 4), with marginal significance (p = 0.047). The range for the government hospitals is from 0.0249 for small to 0.0201 for medium hospitals, while the range for not-for-profit hospitals is 0.0182 for the small to 0.0152 for the medium hospitals.

Salary per FTE (Ratio 10)

The results show that hospital size and ownership type matter. This cost measure is higher in the not-for-profit hospitals than in the government hospitals (p = 0.015) and higher in the larger hospitals than in the small and mediumsized hospitals (p = 0.027). The salaries per FTE in the small and medium-sized hospitals were not statistically different. This produces a stair-step effect for both ownership types (see Figure 5). Further, both ownership types report comparable salaries per FTE (both at approximately $58,000) for larger hospitals.

DISCUSSION

Some of the small hospitals studied are CAHs. These hospitals can be not-forprofit or government-owned and are cost-based reimbursed, based on the percent of patients that are Medicare/ Medicaid. This could explain why the small hospitals report costs per adjusted patient day that are approximately the same as those of the large hospitals (see Figure 3). Many CAHs report a higher cost structure, in all likelihood because of the cost-based reimbursement.

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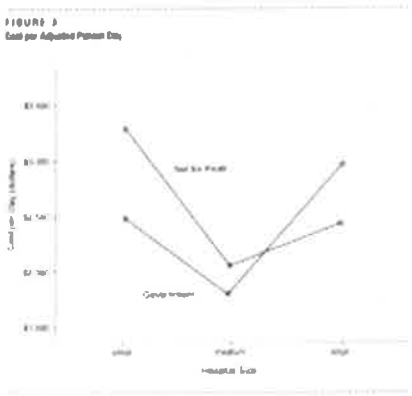

FIGURE 3Cost per Adjusted Patient Day

CAH Consideration

Overall, CAHs account for 84 percent of beds in the small-sized hospital category; 60 percent of revenue, which is smaller because of the 25-bed size limit; and 70 percent of hospitals (see Table 4). This means the majority of the small-hospital activity is accounted for by the CAHs.

Etficiency Results

Not only do size and ownership type independently make a difference in reported levels of efficiency, but also sometimes the combination of these factors affects efficiency. Not-for-profit hospitals appear to achieve higher performance levels, as measured by

current asset turnover, that show medium and large not-for-profit hospitals operate more efficiently than the industry average or the government hospitals for this measure. Further, small and large not-for-profit hospitals appear to achieve higher efficiency levels, as measured by occupancy percentage, compared with government-owned hospitals, except that the larger hospitals of both ownership types report greater efficiency using this measure (thus the V-shaped curve).

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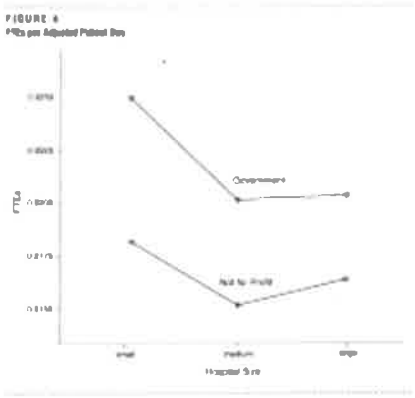

FIGURE 4FTEs per Adjusted Patient Day

Cost Results

As with the efficiency results, the cost results show that not only do size and ownership type independently make a difference, but also sometimes the combination of these factors affects reported cost levels. Perhaps the most revealing finding is that small, not-for-profit hospitals report costs, using cost per adjusted patient day (Ratio 6), that are just as great as those of the largest hospitals, as shown by the absence of detectable statistical differences in the small and large hospitals' costs. This is likely related to the fact that 70 percent of these hospitals are CAHs. It is worth noting that the one size category not participating in cost reimbursement (as are the CAHs) or treating the most costly and medically complex cases (as are the large hospitals) is the medium-sized hospitals (of both ownership types), which report the greatest efficiency (lowest costs) for this measure.

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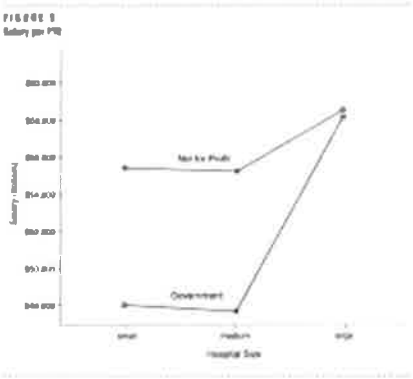

FIGURE 5Salary per FTE

Not-for-profit hospitals achieve higher efficiencies measured by FTEs per adjusted patient day (Ratio 9) than government hospitals, irrespective of size, yet they pay their employees more, as evidenced by their significantly higher levels for salary per FTE (Ratio 10). Further, the results show a stair-step effect with a significant jump in pay for the employees of larger hospitals, irrespective of ownership type, and the employees of small hospitals receiving approximately the same pay as the employees of medium-sized hospitals. In terms of pay levels, the small and medium-sized government hospitals are at the industry average, while the not-for-profit hospitals consistently pay above the industry average.

Wang and colleagues (2001) found rural hospitals performed better on cost measures and attributed this to better cost management strategies in smaller facilities. Further consideration of these cost results is shown in a study of salaries in smaller-sized hospitals by Dalton, Slifkin, and Howard (2002), who found that smaller-sized hospitals generally pay less than larger hospitals and employ less skilled labor. This does not appear to be the case with the small not-for-profit hospitals that, in general, pay above the mean.

CONCLUSIONS

The key conclusions from this study are obvious after examining the results by size for not-for-profit and government-owned Washington hospitals. The answer to the primary research question-do size and ownership type make a difference in the efficiency and cost results of hospitals?-is a firm yes. Indeed, for five of the ten measures studied here, hospital size and/or ownership type makes a significant difference in the efficiency and cost results.

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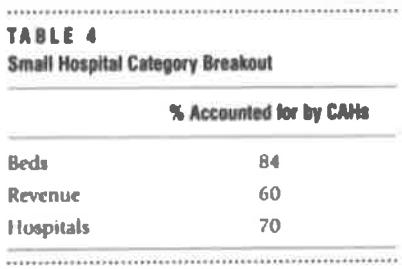

TABLE 4
Small Hospital Category Breakout

	% Accounted for by CAHs
Beds	84
Revenue	60
Hospitals	70

TABLE 4Small Hospital Category Breakout

During periods of economic difficulty, there are discussions about consolidating hospitals. It is reasonable for boards of directors to explore merging hospitals to accumulate assets and increase size. This article provides an analytical framework for evaluating not only merged hospitals but also single hospitals and health systems, according to measures of efficiency and cost as well as industry averages for comparison.

These findings deserve further study on a regional or national level. A more scientific study of the efficiency and cost of hospitals by size and ownership type would be important to control for case mix, scope of services, and payer mix. Given the current economic environment, another important factor is cash liquidity. Access to cash, liquid assets, and lines of credit as needed makes a difference in hospital performance, particularly among the large health systems (Coyne 1987; Coyne and Singh 2008). Such studies can generate important findings about the relationship of hospital size and ownership type to efficiency and cost. Conducted on a national level, such studies would provide policymakers with the empirical data they need to make decisions regarding the types of hospitals to encourage or discourage in the future.

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Joseph S. Coyne, DrPH, professor, Department of Health Policy and Administration, and director, Center for International Health Services Research and Policy, Washington State University, Spokane; Michael Thomas Richards, Senior Financial Analyst, Providence Physicians Services, Spokane, Washington; Robert Short, PhD, director, Washington Institute for Mental Health Research and Training, Washington State University; Kim Shultz, regional financial analyst, Quorum Health Resources Region 3, Lafayette, Colorado; and Sher G. Singh, research associate, Center for International Health Services Research and Policy, Washington State University, and visiting professor, City University, Beijing, China

For more information on the concepts in this article, please contact Dr. Coyne at jsc@wsu.edu.

PRACTITIONER APPLICATION

This article addresses an important topic for healthcare managers and health policymakers. The relationship of hospital size and financial performance continues to be a source of debate in these arenas. This study of hospitals in the state of Washington provides a contribution to each of these areas.

As a director of finance for one of Washington's largest health systems, I read with interest the five significant findings regarding hospital size and financial performance. The results of this comparison are of use to practitioners in hospitals of all three size categories for both ownership types, given the choice of five efficiency ratios and five cost ratios. Further, the use of regional benchmarks is informative in terms of how Washington hospitals compare.

Implementing the Concepts: Strengths and Weaknesses

The researchers chose the hospital performance indicators well. Financial ratios are powerful indicators of financial performance, and the choice of indicators is supported by the information provided to me as a practitioner. In general, the results are clear in meaning and practical in potential for interpretation. A practitioner can easily review the data and conduct an impromptu analysis of his or her own facility for further study.

The study has a few weaknesses: categorization of like-size hospitals, no patienttype adjustment (inpatient versus outpatient), and no case-mix adjustment. Regarding the first, the practitioner would have preferred to see the small hospitals (critical access hospitals with up to 25 beds) grouped together, although the authors provided additional helpful data about the small hospitals. Cost-based reimbursement for their Medicare and Medicaid patient population in critical access hospitals obviously affects their efficiency and cost results, as suggested by the research here. Regarding the second limitation, the smaller the hospital, the larger the percent of business that comes from outpatient services. This affects margins, capital investments, and occupancy. A simple patient-type adjustment would account for this. In addition, future studies should consider case mix.

References to Current Trends

This article adds to the discussion of the role small rural hospitals play, particularly in the state of Washington and in the Northwest. The efficiency results reported here in terms of occupancy percentage show that small and large not-for-profit hospitals appear to achieve higher efficiency levels. Although patient volume is an ongoing difficulty for small rural hospitals, as documented in an earlier study (Douglas 2005), this study shows current results may differ from past results. Besides the cost and efficiency measures of financial performance, future studies could examine the crucial area of quality of care as discussed in a related article (Douglas 2002).

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Sean Douglas, CHFP, CPA, director of finance, Providence Health Care, Spokane, Washington

Details

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The Relationship Between Patient Satisfaction and Inpatient Admissions Across Teaching and Nonteaching Hospitals

Daniel J. Messina, PhD, FACHE, LNHA, senior vice president and chief operating officer, CentraState Healthcare System, Freehold, New Jersey; Dennis J. Scotti, PhD, FACHE, FHFMA, Alfred E. Driscoll Professor, Healthcare and Life Sciences Management, Fairleigh Dickinson University, Teaneck, New Jersey; Rodney Ganey, PhD, founder, Press Ganey Associates, South Bend, Indiana; and Genevieve Pinto Zipp, EdD, PT, chair and associate professor, Graduate Programs in Health Sciences, Seton Hall University, South Orange, New Jersey

EXECUTIVE SUMMARY

The need for healthcare executives to better understand the relationship between patient satisfaction and admission volume takes on greater importance in this age of rising patient expectations and declining reimbursement. Management of patient satisfaction has become a critical element in the day-to-day operations of healthcare organizations pursuing high performance.

This study is guided by two principal research questions. First, what is the nature of the relationship between patient satisfaction (as measured by scored instruments) and inpatient admissions in acute care hospitals? Second, does the relationship between patient satisfaction (as measured by scored instruments) and inpatient admissions differ between teaching hospitals and nonteaching hospitals? Although not suggestive of direct causation, the study findings revealed a statistically significant and positive correlation between patient satisfaction and admission volume in teaching hospitals only. In contrast, a nonsignificant, negative correlation was seen between patient satisfaction and admission in nonteaching hospitals. In the combined teaching and nonteaching sample, a statistically significant, negative correlation was found between patient satisfaction scores and admission volume.

With financial performance being driven in part by admission volume and with patient satisfaction affecting hospital patronage, the business case for a strategic focus on patient satisfaction in teaching hospitals is clearly evident. The article concludes with a set of recommendations for strengthening patient satisfaction and organizational performance.

For more information on the concepts in this article, please contact Dr. Messina at dmessina@centrastate.com.

In today's healthcare marketplace, providers increasingly compete against one another for business. In the late 1980s, healthcare executives were confronted with the realization that they could not just increase charges to generate revenue, but rather they had to contain costs as well. Providers now compete on business factors other than price, such as quality, service, reputation, and other nonmonetary attributes. Ettinger (1998) stressed that successful competition relies on the provider retaining awareness of who it wants to serve, what value it creates for the customer, and how it will create that value operationally. In the end, the provider needs to be strategic rather than tactical and proactive rather than reactive. Providers must shift their focus externally to the consumers' requirements rather than their own.

The need for research regarding patient satisfaction and market share is evident in this age of declining reimbursement and rising patient expectations. Monitoring patient satisfaction has become a standard operating procedure in most healthcare organizations, especially with new Medicare reporting requirements under the HCAHPS program. While patient satisfaction has been widely studied, a gap exists between the impact of customer satisfaction and organizational performance (Kovner and Neuhauser 2004).

The purpose of this research is to study the relationship between patient satisfaction and inpatient admissions among teaching and nonteaching hospitals. The use of inpatient admissions in this study functions as an indicator of volume rather than as a surrogate measure of hospital size. According to Simone (1999), academic healthcare institutions represent an eclectic mix of traditional academia, hospital operations, multiple academic layers, and patients. Today's teaching hospitals, compared with the nonteaching hospitals, are complex organizations trying to perform an often conflicting array of responsibilities. This complex environment can be organizationally and politically challenging to individuals working in such an environment and, as this study begins to explore, may affect patient satisfaction. Furthermore, a teaching hospital's central mission is to provide specialized tertiary care that supports its central objective of training new physicians. In contrast, nonteaching hospitals are organizations that provide general medical-surgical care in an environment that is not focused on training and educating physicians.

Two principal research questions frame this study. First, what is the nature of the relationship between patient satisfaction (as measured by scored instruments) and inpatient admissions in acute care hospitals? Second, does the relationship between patient satisfaction (as measured by scored instruments) and inpatient admissions differ between teaching hospitals and nonteaching hospitals?

LITERATURE REVIEW

Although teaching and nonteaching hospitals alike continue their struggle to capture admissions and, ultimately, market share, research on the relationship between patient satisfaction and volume of admissions has been somewhat limited. A prominent aspect of

the relatively sparse body of literature on patient satisfaction as a driver of performance is the difficulty in quantifying customer satisfaction's direct impact on financial indicator outcomes. Accordingly, substitute measures, such as market share or service volume, are often employed as surrogate indicators of organizational performance.

Woodside, Frey, and Daly (1989) provided early evidence to support the premise that patient satisfaction may directly affect volume. The authors conducted an exhaustive literature review of service quality and satisfaction measurement. Based on this review, they developed a framework of relationships among service quality, customer satisfaction, and behavioral intention for service purchases. Service quality, customer satisfaction, and behavioral intention data were collected from patients discharged from two hospitals. Overall customer satisfaction was associated ($r = 0.85$, $p = 0.05$) with behavioral intention to return to both hospitals. Despite some question of the generalizability of a two-hospital study, the research does provide substantial evidence for a meaningful relationship between overall customer satisfaction and behavioral intention for buying a major service. A further, recent example of the link between patient satisfaction and service volume can be found at the University of Colorado Hospital (UCH), which launched an online system designed to streamline the arrival process by allowing patients to complete insurance paperwork, patient consent forms, and Health Insurance Portability and Accountability Act notification acknowledgments before visiting UCH. Patient satisfaction scores increased, helping boost outpatient visits in one year from 608,689 to 631,332 (Burt 2006).

Valuable contributions to expanding our understanding of the connection between patient satisfaction and organizational performance outcomes can also be found in groundwork laid in earlier research conducted by Rust and Zahorik (1993). The researchers identified elements of service satisfaction that may significantly affect customer loyalty and market share; however, the focus of their research was on retention of existing business versus new customer development. While retention of patients for future business purposes is important, attraction of new customers for outpatient services, surgical services, and obstetrics clearly translates into increased volume through ancillary referrals.

Finally, research performed by Andoleeb (1998) stressed how the public is inclined to pay more for care from quality institutions with which they were satisfied. Andoleeb's study identified several variables that shape patient satisfaction with health services, including quality of communication, perceived competence of service provider, quality of facility, demeanor of hospital staff, and perception of cost and patient satisfaction. The explanatory power of these variables underscores that hospital marketing professionals need to be cognizant of these areas. Andoleeb's argument postulates that a positive association exists between patient satisfaction and patronage (i.e., volume). Accordingly, strategy formulation should focus on gaining a competitive advantage through delivering high levels of service quality, especially in an age of

consumerism where perceived service quality is linked to patient satisfaction, which in turn may result in improved patronage (Scotti, Harmon, and Behson 2007).

METHODS

Study Sample

The study sample consisted of seven teaching hospitals and seven nonteaching hospitals examined over the five-year period from 1999 to 2003 in response to an invitation extended to all Press Ganey client hospitals in New Jersey. Data for all admitted patients who completed the satisfaction survey were included in the study. Press Ganey Associates functioned as the clearinghouse for data to maximize confidentiality of participating hospitals. The sample included seven hospitals in the north region, five hospitals in the central region, and two hospitals in the south region of New Jersey. The questionnaire mailing yielded study participants from geographic regions exhibiting demographic diversity with respect to income levels, insurance coverage, average age, ethnicity, and other characteristics. The patient satisfaction data were collected for each hospital using the complete data sets collected through discharge surveys conducted at the respective institutions. The geographic distribution of New Jersey hospitals statewide is shown in Table 1.

Teaching hospitals, by their very mission, participate in the education of physicians through formal residency training programs. Depending on the type and number of residency programs offered, a hospital is generally designated either a major teaching or minor teaching institution. To be a major teaching hospital, the facility typically offers residencies in medicine, surgery, obstetrics/gynecology, and pediatrics. Many major teaching hospitals also offer residencies in several subspecialties, such as pathology, anesthesiology, and family practice. A minor teaching hospital typically has only two or three residencies, which may include surgery, geriatrics, or obstetrics/gynecology. Depending on the involvement and politics of an academic university, teaching hospitals are often university hospitals, university affiliated, or independent (Swayne, Duncan, and Ginter 2006).

Subjects

The study included adults who voluntarily completed surveys mailed to their households immediately following discharge. To encourage patients to respond to the survey, a solicitation letter was sent by a representative of the hospital to the patient. In the cover letter attached to the survey, an explanation of the study and the purpose of the survey questionnaire were provided. Consent is implied when patients voluntarily complete the hard-copy survey; enclose it in a sealed, addressed envelope; and return it either to their respective hospital or directly to the clearinghouse. Confidentiality and other rights of patients consenting to participate were protected in accordance with IRB (institutional review board) requirements. Because of restrictions imposed by the survey management process, a formal assessment of nonresponse bias was difficult to ascertain.

The overall scores for this study were obtained from hospitals that had

TABLE 1
Geographic Distribution of Teaching and Nonteaching Hospitals

	North Region (N)	%	Central Region (N)	%	South Region (N)	%
Teaching hospitals	21	43	11	52	18	72
Nonteaching hospitals	28	57	10	48	7	28
Total	49	100	21	100	25	100

Source: New Jersey Hospital Association Health Economics Department (2005).

consented to participate after receiving a letter crafted by members of the research team. Hospitals interested in participating in the study submitted their inpatient admission data for the years 1999, 2000, 2001, 2002, and 2003. After coding the patient survey data and pairing them with respective hospital volume data, a database was compiled to facilitate statistical analysis. To preserve confidentiality, the identities of the participating hospitals were blinded, and the database provided only general information about the geographic location of the responding institutions. The names of participating hospitals were shared with the New Jersey Hospital Association, which in turn provided an overview of state demographics using the most current data available. Participating sites were offered a copy of the study results. These data were strictly informational and not used in the statistical analysis.

Instrumentation

The questionnaire used to measure inpatient satisfaction in this study was first developed in the late 1980s. In 1997, it was modified to maintain its validity in tracking patients' preferences and experiences. The instrument was developed after conducting customer/patient focus groups, reviewing the current customer satisfaction literature, reviewing survey instruments from across the United States, and using the latest tools and techniques on survey design from healthcare organizations across the United States. In 2002, a validation study of the Inpatient Satisfaction Survey was conducted to ensure internal consistency and reliability (Press Ganey Associates 2002). The survey instrument was found to be psychometrically stable across a wide spectrum of tests of validity and reliability. The overall Cronbach's alpha reliability score is 0.94.

The survey included queries related to background, admission process, room, meals, nurses, tests and treatments, visitors and family, physician, discharge, personal issues, and overall assessment. Patient satisfaction was measured using a five-point Likert-type scale labeled as follows: 1 = very poor, 2 = poor, 3 = fair, 4 = good, and 5 = very

good. The data were then converted to a 0 to 100 scale, (entering the 1–5 scores and averaging them), with 0 being the low end of very poor and 100 being the high end of very good.

Statistical Testing

Descriptive statistics in the form of frequencies, means, medians, and standard deviations were computed and used to examine the specific characteristics of the hospitals with respect to their (1) patient satisfaction mean scores and (2) inpatient volume data as measured by admissions. Statistical measures of skewness and kurtosis were also performed to permit scrutiny of the shape and distribution of the survey response data.

Examination of the data revealed that, because of the small sample size, whether the data were normally distributed could not be conclusively determined; therefore, nonparametric statistical testing was chosen to further analyze the data. The Spearman coefficient of rank-order correlation was used to analyze relationships between the independent variable (patient satisfaction mean score) and the dependent variable (volume as measured by admissions). Correlation analyses were performed on a pooled sample of seven teaching and seven nonteaching hospitals. Then an analysis of the differences between the teaching subsample and nonteaching subsample were performed using a Mann-Whitney U-test. Following this test, separate analysis was performed on the seven teaching and seven nonteaching hospitals. The two variables were used not to discover whether a causal relationship existed but to discern whether an association existed between satisfaction mean score and admissions.

RESULTS

The following descriptive statistics are for the aggregate set of teaching and nonteaching facilities. The mean number of admissions across all hospitals was 19,111 over the five-year period from 1999 to 2003, with a range of 4,513 to 70,465. The aggregate satisfaction mean score was 82.57 for the five-year period, with a minimum of 79.05 and a maximum of 86.18. The descriptive statistics for skewness and kurtosis indicate that the admission volumes were not normally distributed. Patient satisfaction mean scores were approximately normally distributed. A summary of descriptive statistics is presented in Table 2.

Spearman rank-order correlation analysis revealed a significant negative correlation ($r_s = -0.287$, $p = 0.018$) between patient satisfaction and admission in the combined sample, suggesting that higher patient satisfaction mean scores are associated with lower inpatient volumes.

A comparative analysis of patient satisfaction that examines differences between teaching and nonteaching hospitals was performed using a Mann-Whitney U-test. This test is a nonparametric analog of the independent group's t-test. It was used to determine if differences existed between the two independent groups—teaching and non-teaching—based on rank-ordered scores. Mean rank for teaching hospital patient satisfaction was 25.76; mean patient satisfaction rank for nonteaching hospitals was 45.24. Mann-Whitney U

TABLE 2
Descriptive Statistics: Aggregate Teaching and Nonteaching Hospitals

	Admissions	Satisfaction
N	69	69
Valid N*	68	68
Range	65952.00	7.13
Minimum	4513.00	79.05
Maximum	70465.00	86.18
Mean	19110.64	82.5735
Mean standard error	1740.330	0.24092
Standard statistic	14456.26	2.00123

* Variations in N because of missing data.

tables can be used to determine significance when there are 20 or fewer cases. At n > 20, the value of U approaches a normal distribution. This study involved five years of data from seven hospitals (n = 35). Therefore, U is transformed to a z-statistic, and the value of $\pm z$ can be compared on a table of critical values for a normal distribution. The z-statistic ($z = -4.064$, $p < 0.001$) was significant, indicating that the null hypothesis that the two groups—teaching versus nonteaching—are identical must be rejected and the alternate hypothesis that the two groups are significantly different is supported. Here, the z score results were approximately four standard deviations away from the mean.

The mean admission volume of teaching hospitals in our sample (1999–2003) was 27,745 (median = 22,820; mode = 14,244, multiple modes exist, the smallest is shown) with a range of 14,244 to 70,465. The mean for nonteaching admission volume was 10,722 (median = 12,314) with a range of 4,513 to 16,067. The data indicate that teaching hospitals had higher admission volume than nonteaching hospitals in the years spanning 1999 through 2003. The admission volume data did exhibit deviations from normality in the teaching institutions, but not in the nonteaching institutions.

The mean patient satisfaction score for teaching hospitals was 81.54 (median = 81.78), with a minimum of 79.05 and a maximum of 84.12. The mean nonteaching satisfaction score was 83.58 (median = 83.58), with a range of 80.61 to 86.18. Analysis of skewness and kurtosis statistics did not suggest a significant departure from normality in the distribution of satisfaction scores (refer to Table 3).

Analysis of the individual Spearman rank-order correlation coefficients revealed a statistically significant and positive correlation ($r_s = 0.581$, $p < 0.001$) between patient satisfaction and admission volume in teaching hospitals. In contrast, a nonsignificant and negative

TABLE 3
Descriptive Statistics: Teaching Versus Nonteaching Hospitals

		Total Admissions (Teaching Hospitals)	Satisfaction (Teaching Hospitals)	Total Admissions (Nonteaching Hospitals)	Satisfaction (Nonteaching Hospitals)
N*	Valid	34	34	35	35
	Missing	1	1	0	0
Mean		27745.76	81.5376	10722.23	83.5797
Standard error of mean		2788.328	.27415	641.41055	.31233
Median		22820.00	81.7750	12314.00	83.5800
Mode		14244.00[a]	82.44	4513.00[a]	81.75
Standard deviation		16258.60	1.59858	3794.636	1.84779

[a]Multiple modes exist. The smallest value is shown.
* Variations in N because of data availability.

correlation ($r_s = -0.097$, $p = 0.579$) was seen between patient satisfaction and admissions in nonteaching hospitals. The results are reported in Table 4.

DISCUSSION

The purpose of this study was to examine the relationship between patient satisfaction and volume of inpatient admissions in teaching versus nonteaching hospitals. In the aggregate analysis, the results of the study show a significant, but negative, relationship between patient satisfaction and inpatient volume. Further study revealed that differences exist between mean scores for patient satisfaction in teaching and nonteaching hospitals. When disaggregated into subsamples, a significant, positive relationship is found between patient satisfaction and inpatient volume in teaching hospitals, and a nonsignificant, negative relationship is seen between these variables in nonteaching hospitals. These findings suggest that in the combined teaching and nonteaching sample, as satisfaction drops, volume increases; however, this counterintuitive conclusion is partially offset by the emergence of a significant positive correlation between satisfaction and admission volume in teaching hospitals alone. The later finding may be attributed to the fact that patient satisfaction mean scores of teaching hospitals are statistically lower, thus exhibiting a statistically significant, positive correlation between satisfaction and admission volume.

Another possible explanation for the statistical differences in teaching and nonteaching hospitals' patient satisfaction is the size and complexity of teaching organizations in contrast to nonteaching facilities with multiple caregivers and contact points with a given patient. This organizational difference in part may explain the lower patient satisfaction scores. Patients in

TABLE 4
Spearman Rank-Order Correlations: Teaching Versus Nonteaching Hospitals

		Total Admissions (Teaching Hospitals)	Satisfaction (Teaching Hospitals)	Total Admissions (Nonteaching Hospitals)	Satisfaction (Nonteaching Hospitals)
Admissions (teaching hospitals)	Corr. Coeff.	1.000	0.550**	0.812**	−0.081
	Sig. (2-tailed)	0.001	.	0.004	0.002
	N*	33	34	34	34
Satisfaction (teaching hospitals)	Corr. Coeff.	0.581**	0.985**	0.510**	−0.488**
	Sig. (2-tailed)	0.000	0.000	0.002	0.003
	N*	34	34	35	35
Admissions (nonteaching hospitals)	Corr. Coeff.	0.812**	0.477**	1.000	−0.032
	Sig. (2-tailed)	0.650	0.002	0.857	.
	N*	34	34	35	35
Satisfaction (nonteaching hospitals)	Corr. Coeff.	−0.269	−0.441**	−0.097	0.558**
	Sig (2-tailed)	0.125	0.009	0.579	0.000
	N*	34	34	35	35

* Variations in N because of data availability.
** Correlation is significant at the 0.05 level (two-tailed)

teaching hospitals tend to be immersed in a very complex environment that, at times, may challenge service providers, as well as the organization at large, to provide patient-focused care (Press 2002). The mission in a tertiary teaching environment contrasts sharply with the mission of a nonteaching community hospital, whose mission is to provide personal healthcare in a manner that uses the available resources most effectively for the community's benefit (Griffith and White 2006).

The provision of graduate medical education vastly complicates the process of rendering care in a teaching hospital. Therefore, it is no surprise that statistically significant differences in teaching versus nonteaching mean patient satisfaction scores were found. It is possible that the focus on medical education and the technical aspect of care emphasizes elements of service quality that patients are not qualified to judge or do not find intrinsically satisfying. Accordingly, less concentration may be placed on the provision of healthcare in a personal manner, to which patients are likely to respond more favorably. It is this more personal provision of care that is part of the mission in the nonteaching community hospital. The focus in mission may, in part, explain the lower scores in patient satisfaction in

teaching versus nonteaching hospitals. Further, length of stay tends to be higher in teaching hospitals and may also affect patient satisfaction scores. Additionally, the typically higher admission rate in teaching hospitals than in nonteaching hospitals may explain the negative correlation associated with lower patient satisfaction mean scores.

CONCLUSIONS

Managerial Implications

The findings in this study suggest that patient satisfaction may be a factor driving volume in teaching hospitals. The study group revealed that for nonteaching hospitals, patient satisfaction and volume growth were not strongly correlated, which may suggest the opportunity for teaching hospitals to capture additional patient volume by studying and revitalizing their approach to and emphasis on patient satisfaction. As such, organizations should consider refocusing their service delivery systems from provider-centric models to patient-oriented models.

All patients come to the hospital with their own set of expectations of service and care. Early identification and recognition of these expectations are critical, as true patient satisfaction is derived from the balance of patient culture and clinical culture (Press 2002). Healthcare today is provided by a complex and diverse array of professionals, and patient satisfaction is accomplished through a complicated set of exchanges that translate into a healthcare experience (Sturm 2005). Business success cannot be built on a series of one-time visits, but it can be seriously damaged by a series of one-time experiences. True patient satisfaction means a total, positive healthcare experience.

Results from this study suggest that in some cases improving patient satisfaction pays. Studies confirm the link between patient perceptions of quality and financial measures, particularly profit margins (Press 2002). In a study of 82 hospitals conducted by Harkey and Vraciu (1992), a one standard deviation change in the quality score resulted in a 2 percent increase in operating margin. Garman, Garcia, and Hargreaves (2004) estimated that increasing average patient satisfaction scores from the 3–4 range to the 4–5 range translated into a $2.3 million boost in incremental annual revenue. While further research is clearly needed in the field, healthcare executives might consider practices that include, but are not limited to, enhancing patient satisfaction as a core strategic goal; expanding ongoing satisfaction measurement systems; maximizing steering committee performance results; and implementing sound patient satisfaction training modules to employees, medical staff, and student interns, just to name a few.

Patient-focused care does not mean just listening to the customer but rather making the customer the pivot point of all initiatives to evaluate or redesign care, including (1) customizing service based on patient needs and values, (2) empowering the patient to take control by participating in the care process, (3) sharing knowledge and information, and (4) practicing evidence-based decision making (Bisognano, Lloyd, and

Schummers 2007). Consumer-driven healthcare is no longer a speculative trend; it is an emerging reality.

Study Limitations and Future Research

Our study represents only one of a few evaluating the relationship between patient satisfaction and inpatient volume. This study supports the need for further research with larger diverse populations that might ensure an even higher degree of generalizability. It also raises questions about the need for further research in both the teaching and nonteaching environment.

The competitive nature of the industry and the desire to protect and grow provider markets produced great concern about release of data from the participating hospitals. While geographic representation on the surface appears to have been accomplished, many other influencing variables such as definitive locations, payer mix, bed capacity, marketing budgets, physicians on staff, and major program development were unknown. The influence of these variables could only be evaluated in the broader context of the state. However, release of any one or a series of these demographic data points could have breached the confidentiality of the participating hospitals' data. Throughout the study, confidentiality was critical to sustained participation of the subjects. The inability to control these influencing variables hence greatly affects the generalizability of these findings.

Methodological limitations, such as the small sample size, may also have affected the findings. Future studies should increase the sample size of teaching and nonteaching hospitals, expand the number of years over which data are collected, and expand into other geographic areas nationwide to maximize the generalizability of the findings. In addition, controlling for age, managed care penetration, payer mix, bed capacity, marketing budgets, clinical program offerings, and medical staff size and satisfaction levels would also be needed to conduct a study to determine the cause of the relationships between patient satisfaction and inpatient volume growth found in this study.

Another methodological adjustment might be to use percentile scoring rather than mean scoring. Using the percentile score places the data in a broader context of where patient satisfaction with the organization falls in relationship to its competitors. An increase in the mean score may not adequately reflect a significant improvement in patient satisfaction overall if the organization's competitors have increased their mean scores to a greater degree, thereby dropping the measuring organization's percentile rank. Therefore, patient satisfaction might be more accurately represented by percentile rank than by satisfaction mean scores.

Because this is a cross-sectional study, the findings do not suggest causation but simply establish a correlation between teaching hospital satisfaction and inpatient volume. The study attempts to provide a starting point for further analysis of this relationship. Further research might include adjustments for severity, hospital size, Medicare case-mix index, service line analysis, or length of stay. This last factor may reveal

some interesting findings regarding the relationship between satisfaction scores and length of inpatient stay.

This research effort is not intended to be a prescription for increasing volume. Clearly, further study is required to strengthen the conclusion that patient satisfaction drives volume. Until subsequent research addresses these many unanswered questions through the longitudinal study of larger data sets, making a definitive business decision for the allocation of resources to improve patient satisfaction is difficult. However, the present research supports the conclusion that a positive correlation exists between patient satisfaction scores and volume growth among teaching hospitals, providing one more instrument in the practicing healthcare executive's tool kit.

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ADDITIONAL RESOURCES

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PRACTITIONER APPLICATION

Larry L. Mathis, LFACHE, executive consultant, D. Peterson & Associates, Houston, Texas

The study by Daniel J. Messina and colleagues on the relationship between patient satisfaction and inpatient admission volumes makes an important contribution to the field of hospital management, but I share the authors' frustration in their "counterintuitive" and disappointing conclusion. While the study found a positive relationship between patient satisfaction and inpatient admission volumes in teaching hospitals, it found a negative relationship in nonteaching hospitals. My experience as CEO of both a major teaching hospital and a system of nonteaching hospitals leads me to believe that a positive correlation exists between patient satisfaction and inpatient admissions in *all* types of hospitals when the patient can influence the choice of hospital for his or her admission.

Admission volumes to hospitals of all types are influenced by a wide array of variables. In addition to those identified in the article, the shifting of admitting physicians and/or physician groups from one hospital to another or the addition or closing of hospital units can dramatically affect admissions. Because of necessary confidentiality concerns, such variables could not be included in the study. Further research is necessary to determine the impact of patient satisfaction on admissions when all of these variables are taken into account. I believe the results of such a future study will lead to a less disappointing conclusion.

I spent my entire professional career in a hospital system whose mission was "to provide the best care and service" not only in our flagship teaching hospital but also in our affiliated hospitals. Patient satisfaction was our mission and our strategy. We knew that patients often could not judge the quality of their medical care, nor would they always obtain the hoped-for cure or a desirable medical result, but every patient was an expert on customer service and had definite expectations for his or her care and treatment. Our goal for each patient was to exceed those expectations and to delight him or her with our brand of service. The CEO's, every executive's, and every employee's compensation was based, at least in part, on measured patient satisfaction. In both our teaching and nonteaching hospitals where patient satisfaction was high and/or improving, inpatient admissions increased and the bottom lines were strong.

Our experience showed that high patient satisfaction affected our hospitals' performance both directly and indirectly: directly, by influencing the patient's decision to choose one of our hospitals for a subsequent admission, and indirectly, by influencing both physician groups and managed care plans to select our system hospitals because of their reputations for outstanding service.

As called for in the article, the field needs further research to validate not only the relationship between high patient satisfaction and increased inpatient admission volumes but also the link between high patient satisfaction and other measures of organizational performance. However, the idea that a proven positive correlation should lead to a "focus" or "program" of improved patient satisfaction is a flawed one. Attaining high patient satisfaction with hospital care and service is not a program in our business, it *is* our business.