Patients as Consumers:

Hospitality and Patient Satisfaction in the New Market for Medicine[1]

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ABSTRACT:

Treating medical patients as ideal consumers in a "market for medicine" creates significant challenges and problems for a market-based medical system. Drawing on a sample of 3,000 U.S. hospitals, we find that patients have limited ability to gauge the medical quality of their hospital. Improving patient safety and medical quality has little impact on patient satisfaction. In contrast, patients are more sensitive to "room and board" aspects of care. Quiet rooms matter more for patient satisfaction than medical quality, and personal interactions with nurses affect patient satisfaction much more than the hospital survival rate. Patients seem to evaluate their hospitals based on what they can immediately observe, rather than on the factors that most influence their health outcomes. Moreover, competition among hospitals leads to improvements in "room and board" care, but not improvements in medical quality. When hospitals face greater competition from other hospitals, patient satisfaction increases while medical quality declines. These findings suggest that in a consumer-driven market for medicine, hospitals are rewarded more for "hospitality" than for patient safety or medical quality.

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Introduction

The system of health care in the United States is increasingly based on market transactions in which patients are seen as consumers. With the marketization of medical care, doctors and hospitals are encouraged to operate as business enterprises in which "customer satisfaction" is a growing priority and objective. However, it is not yet clear how beneficial it is to make patient consumerism a driving logic of health care. Despite the increasing importance of customer satisfaction, there are still central questions about what drives it. Are patients able to observe the medical quality of their hospital? Does the pursuit of customer satisfaction lead hospitals and doctors to provide better medical care?

Market proponents insist that better outcomes would emerge if health care was more focused on customer satisfaction. Moreover, for market proponents, an ideal healthcare market would have only limited insurance so that patients make more careful cost-benefit tradeoffs in choosing their medical treatment. If patients came to physicians with "cash in hand," they would demand better and more cost-effective treatment. Paying more health care expenses out of pocket will "activate" patients into consumers and "drive a new quality paradigm" (Retchin 2007:173). This perspective is embraced by the "consumer-driven health care" movement in the United States (Herzlinger 1997; 2004). They argue that "satisfied patients mean higher quality care" (Press 2006:12). As market advocate Regina Herzlinger insists, "health care will not improve until consumers drive it" (Herzlinger 2004:XXIII).

In contrast with market proponents, we argue that patients-as-consumers face a problem of partial information. Hospitals provide two very different types of services: technical medical treatment on one hand, and hospitality or "room and board" care on the other. We argue that patients have limited ability to observe the technical quality of their medical care. However,

patients they can observe the hospitality / room and board aspects of their care quite well. This ability to easily observe hospitality, but not medical quality, may be distracting and be given undue weight in both consumer decisions and customer satisfaction with a hospital.

Where emergent markets suffer problems of quality uncertainty and asymmetric information, marketization may bring significant downside risks to consumers (Akerlof 1970; Arrow 1963). Markets will deliver what consumers can observe and financially reward, which may not be the same as what consumers want or need.

We test the relative importance of hospitality and medical quality for shaping customer satisfaction, using a large sample of American hospitals. What aspects of hospitals lead to patient satisfaction? Is patient satisfaction driven more by the 'hard' technical skills of medical staff, or the 'soft' skills of hospitality, private rooms and comfortable amenities? Past research suggest both aspects of a medical setting can influence patient satisfaction. Unfortunately, most research looks at these factors in isolation – studies of *either* hard medical skills (Jha et al 2008; Fenton et al 2012) *or* studies of hospitality (Barr et al 2000). This does not match how medical treatment is experienced. We find that while both factors play a role, patients give relatively minor aspects of hospitality greater weight than patient safety or medical quality. Our findings suggest that patients rate their hospitals based on the things they can most easily observe. These are overwhelmingly hospitality features. Customer satisfaction focuses attention on aspects of quality that are most visible to patients, but less relevant to their eventual health outcomes.

In a follow-up analysis, we examine how market competition affects hospital outcomes. We find that when a hospital is located in a more competitive market, patient satisfaction is higher but medical quality is lower. When hospitals compete for patients and customer loyalty, it

seems there are different returns to investing in medical quality versus investing in patient hospitality.

Does Customer satisfaction reflect (H0) medical quality, or (Ha) hospitality?

*** Theoretical contribution:*

As the market and consumer logics grow, hospitals face increasing pressure to focus on the hotel-like amenities of the hospital experience that are immediately observable to patients. Technical medical quality and patient safety, in contrast, are much less sensitive to consumer-driven market pressure. A heath care system that rewards customer satisfaction – rather than long-term medical outcome – is at risk of emphasizing short-run aspects of hospital care that are less important than the health, safety, and wellbeing of medical patients. In a "free market" for medicine, patients may not be able to identify and reward the hospitals and doctors that best serve their medical needs. Marketization, in this context, may introduce incentives for hospitals that distract from their core mission of medical excellence and patient safety (Starr 1982; DiMaggio and Powell 1983). Hospitals that focus on hotel-like amenities may do a poor job of improving health outcomes or meeting patients' long-term medical needs.

Moreover, if market-driven 'customer satisfaction' becomes the primary ethical requirement of medical practitioners, patients will be in a weak position to demand better quality medical care. Rather than drivers of their medical care, patients-as-consumers may find their role limited to demanding greater courtesy, more politeness, better parking, tastier food, and more vivid expressions of empathy in the world of medicine: these, in the end, are the elements that patients are best able to evaluate and reward with their own health care dollars.

Consumer-driven health care will never focus solely on hotel amenities, but consumerism demands much more attention on hospitality than medical quality.

Customer Satisfaction in the Market for Medicine

The last one hundred years of medicine has witnessed breathtaking advances in the capacity to treat and cure injury and illness. However, there remain serious problems in the quality and safety of medical treatment in the United States. In 1999, the Institute of Medicine issued a landmark report titled, "To Err is Human," focusing attention on the alarming prevalence of medical mistakes, estimating that nearly 100,000 people in the U.S. die each year from such mistakes in medical practice (Kohn, Corrigan, & Donaldson 2000). Doctors frequently fail to undertake the appropriate diagnostic tests or apply the full recommended treatment for many classes of illness (McGlynn, et al 2003; RAND 2006). Review of medical records has found that little more than half of adults (55 percent) receive the recommended treatment for their ailments (McGlynn et al., 2003), while children receive 47 percent of recommend care (Mangione-Smith et al., 2007). As one report summarized, "patients should not assume that their physicians will remember all that needs to be done" (RAND 2006:5). Progress on improving patient safety has proved frustratingly slow (Landrigan et al 2010; Longo et al 2005).

The market-driven (Herzlinger 1997), or "consumer-driven" (Herzlinger 2004) health care movement focuses on the intuition of market-based incentives and cost control. This means medical practice that is focused increasingly on achieving high levels of customer satisfaction.[2]

[2] Advocates of market-based medicine also call for more limited health insurance and direct out-of-pocket spending by medical customers to nurture a greater consumer orientation.

Customer satisfaction measurement is both a management tool and a forward metric of financial performance. It is one of the most widely-used business metrics across industries. As a handbook on business measurement notes,

> Within organizations, customer satisfaction ratings can have powerful effects. They focus employees on the importance of fulfilling customers' expectations. When these ratings dip, they warn of problems that can affect sales and profitability. (Farris et al 2010: 56)

Many expect the discipline of customer satisfaction to push hospitals towards better medical care. Customer satisfaction is a movement, not just towards rankings and measurement, but specifically towards a business conception of what is important in medical practice. It calls on the discipline of customer satisfaction to push hospitals towards better medical care.

Market information regimes, such as satisfaction ratings, privilege certain kinds of information about quality (Annan and Peterson 2000). Rankings make some aspects of quality more visible to consumers, and encourage competition on those dimensions (Espelend and Sauder 2007; Sauder and Espeland 2009). In higher education, for example, *US News and World Report* rankings emphasize a university's admission rate as a central metric of quality. The result has been intense competition among universities to reject more applicants and lower their admission rates.[3] However, a key concern is that customer satisfaction ranking can divert attention away from patient safety and medical quality.

The difference between a 'customer' and a 'patient' is one of institutional logics, and these notions set up different focal points and expectations for medicine. At one end of this continuum, doctors and hospitals act as retail businesses, selling health care products and services that customers wish to buy. The goal of market-based medicine is to produce customer

[3] At Stanford University, for example, the admission rate has fallen from 11 percent in 2006 to under five percent in 2016. (http://wapo.st/1RuKUy2)

satisfaction, just as with any other consumer-facing business. At the other end of this continuum is the professional pursuit of medical excellence, in which doctors diagnose the patient's problem, identify the best course of treatment, and provide or refer that treatment in the best interest of the patient's health and wellbeing.

The market logic emphasizes competition for consumers, in which attracting patients is the foundation for economic viability and prosperity. In this view, the patient-as-consumer determines how well their medical expectations were met, and decides which medical provider should receive their brand loyalty and future health care purchases. Competition among doctors and hospitals drives medicine towards the treatments and practices that most successfully attract paying customers.

Two Aspects of Hospital Care

It is easy to think of customer satisfaction as a natural goal. Consumer choice and customer satisfaction, however, are problematic signals in a market characterized by quality uncertainty and asymmetric information (Akerlof 1970; Arrow 1963). Markets are driven by what consumers can observe and reward with higher spending and repeat business, which ironically may not be what patients most need or want from their medical providers.

Hospitals face the challenge of balancing two general tasks: providing technical medical treatment, and hospitality or "room and board" care while the patient lives in the hospital. At a professional level, these tasks often run in an opposite direction. While some types of treatment provide immediate relief from suffering, medical intervention is often painful and unpleasant, sacrificing short-term well-being for long-term gains in health status, physical functioning and life expectancy. Sick and injured patients allow themselves to be cut open, radiated, exposed to

toxins such as chemotherapy and other cocktails of potent medication; in Freidson's words, patients are "palpated, poked, dosed, purged, cut into, probed, and sewed" (1970:138). Medical treatment often makes patients worse before making them better.

The other aspect of hospital treatment involves less-technical, more mundane care for the patient while they live in the hospital: the "room and board" aspect of care. Patients must be fed (is the food warm, tasteful?), they must sleep (is the room quiet or overrun?), they must cope with their immediate pain, anxiety, fears, and frustrations (are the nurses and staff kind and compassionate, generous with pain medication, quick to respond to problems?). Much of this is non-technical comfort work. As Strauss et al (1985) once noted, "failure to do comfort work to the satisfaction of patients when they are hospitalized is a major source of [patients'] anger and frustration – leading often to bitter complaints and accusations of incompetence or negligence" (99).

Patients face a difficult task of evaluating their hospitals when there are two such different aspects of treatment. The most critical aspects of hospital care are the hardest for patients to observe.

For the vast majority of patients, hospitals represent a limited information context. People can only decide on what they can see and medical services are more opaque. Patients generally lack expertise in medicine. Much technical medicine goes on 'behind the scenes,' when patients are incapacitated or unconscious. Patients do not really understand hospital organization and the organizational dynamics that protect patients, or the breakdowns that put patients at risk (Kohn, Corrigan and Donaldson 2000). And hospital patients are usually anxious and fearful, and don't want to think about failures of technical quality. In short, hospital patients do not usually have the expertise, access, awareness, or even disposition to critically evaluate the medical care they

are receiving – whether they have received the appropriate medication, been properly prepped for surgery, and so forth.

In contrast, the quality of "room and board" care in hospitals is exceedingly visible to patients. They know when the food is cold and tasteless, when their room is loud and overcrowded, when the nurses and staff are too busy or indifferent to tend to their pains and problems. Hence, patients have *partial* uncertainty about quality, or partial information asymmetry.

This partial information problem shapes how patients evaluate their hospitals and medical care. Under conditions of uncertainty, "auxiliary characteristics become proxies for quality" (Lynn 2006:1). Patients may think of the world as having "good" hospitals and "bad" hospitals, and then use whatever information they can observe to categorize their hospital. Unpleasant nurses and busy, noisy rooms, then, become evidence that one is in a "bad" hospital. Room and board / hospitality care becomes a proxy for the (unobservable) medical quality that will most impact a patient's life.

This type of process of inferring from the observed to the unobserved can be seen in other settings. In used car markets, buyers may consider the cleanliness of a car as evidence of its mechanical condition (Akerlof 1970). In social status research, Lynn, Podolny and Tao (2009) analyze how quality uncertainty can lead to the "decoupling" between an individual's merit and their social status. In psychology, a large body of research shows there is a "halo effect" of beauty, in which physically attractive people are regarded as more intelligent, competent, and trustworthy (Feingold 1992; Langlois et al 2000). In all of these cases, individuals are using technically unrelated or extraneous information to "fill in" important gaps in their knowledge in order to make decisions.

In medicine, there may be a halo effect of hospitality. Hospitals that provide excellent bedside manner, comfort, convenience and emotional empathy may be seen as providing robustly excellent treatment. If a hospital 'cares' about a patient's comfort and emotions, then they must care about their organs and their cancer – they are taking great care of the patient. Comfort and emotion work become proxies for hard-to-observe medical quality and patient safety. Nonetheless, hospitality and medical excellence are different competencies; patient ratings of hospitals may be heavily skewed towards the readily-observable hospitality aspects.

This problem – the relative observability of hospitality and medical excellence – also shapes what hospitals must do to compete for patient satisfaction and customer loyalty. The organizations literature has long emphasized the need to gain legitimacy and support among stakeholders that have limited information about organizational performance (DiMaggio and Powell 1983; Meyer and Rowan 1977; Khurana 2002; Sauder and Espeland 2009). Organizations may adopt forms and practices that are not necessarily effective for their purpose and mission, but that will assuage concerns and doubts among weakly-informed stakeholders. For example, non-profits and government agencies have widely adopt the principles, language, and practices of the corporate sector, not because these are ideally suited to the social mission of non-profit work, but rather because it may signal quality to, and generate confidence among, outside stakeholders. Some degree of mission drift or goal displacement is an unintended consequence of having important stakeholders with partial information. Often, this means appealing to stereotypes of what "good practice" looks like. In the case of hospitals, the weakly informed stakeholders are not wealthy benefactors, investors, or regulators, but rather patients who may not be well aware of the tradeoffs (or lack of correlation) between hospitality and technical medicine.

When hospitals compete on the basis of patient satisfaction, they may face an incentive to neglect hard-to-observe medical quality and invest more in superficial (ie, observable but less important) aspects of care. In a consumerist model of medicine, hospitals face an incentive to provide forms of care more visible to patients. Technical quality and patient safety may be de-prioritized and even crowded out by market forces that reward hospitality more than medical quality.

It is tempting to ask, which is better to serve the ultimate needs and wants of patients: the 'professional' focus on medical excellence, or the 'business' aspiration of customer satisfaction? However, this is a difficult question to answer. (It depends on how much patients value hospitality and comfort during the course of medical care.) Our question is more limited and more tractable: how different are these priorities? Do they lead doctors, hospitals, and patients towards different kinds of treatment? How do they address nagging problems in the quality of medical care in America?

Existing Evidence

In a study of routine medical office visits, Barr et al (2000) found that the politeness and courtesy of office staff had a large and direct effect on how patients rated the quality of their doctor. In a study of heart attack patients, satisfaction was high overall (92 percent satisfied), regardless of technical quality of treatment; moreover, satisfaction was not associated with long-term survival or the probability of recurrent heart attack (Lee et al 2008). A study of elderly patients found that technical care had no association with patient satisfaction ratings; however, quality of interpersonal interaction with medical staff had a very strong correlation with patients'

overall assessment of the quality of their care (Chang et al 2006). These studies suggest that patients have trouble distinguishing between technical medical quality and hospitality.

On the other hand, a study using Medicare hospital data found that "care was consistently better in the hospitals that received high [patient] ratings" and concluded that "there is no need for tradeoffs between" technical quality and patient satisfaction (Jha et al 2008:1930). In pediatric care, parents' dissatisfaction with their children's care has been found to be a reliable marker of an inappropriate course of preventative child medicine (Schempf et al 2007). Finally, HIV patients are more likely to switch away from doctors that test poorly in antiretroviral knowledge (Rodriguez et al 2007), findings which, as the authors concluded, "challenge the notion… that patients are unable to assess the technical quality of care they receive" (Rodriguez et al 2007: 194).

These studies, to some degree, talk past each other and fail to aggregate well. The critical issue is the *relative importance* of medical and non-medical factors in generating patient satisfaction. That relative importance is what shapes the investment decisions of doctors and hospitals in a consumer-driven market for medicine. It is not simply that there is mixed evidence; the existing studies are often testing different null hypotheses: a) whether hospitality has an effect on patient evaluations, and b) whether medical quality has an effect on patient satisfaction. This study provides large-scale evidence that directly compares the effects of hospitality and clinical quality on patient satisfaction.

Empirically, this paper draws on a large sample of American hospitals, with data on the technical quality of medical care, the hospital death rate, and the hospitality / room and board aspects of care. We test the degree to which patients can identify (are more satisfied in) hospitals with better quality medical care and lower death rates, especially compared to hospitals with

high levels of hospitality or "room and board" care. Further, we test whether greater competition among hospitals increases either patient satisfaction or medical quality.

Data Set

Our data combines hospital-level information on patient satisfaction, technical medical quality, patient mortality rates, and hospitality aspects of care. Some 3,180 hospitals (65 percent of acute care / critical access hospitals in the US[4]) are included, for the three-year-period July 2007 to June 2010. The data were obtained from the Hospital Compare Database, provided by the Centers for Medicaid and Medicare Services (CMS). Simple inspection indicates that the sample over-represents the larger, more urban hospitals that service the majority of the population, and under-represents the smaller rural hospitals. Missing data on mortality brings the final sample down to 3,019 (95 percent of the original sample). Descriptive statistics for the full data set are provided in Table 1.

[Table 1: Descriptive Statistics]

Patient satisfaction. The outcome variable in this study is patient satisfaction. Patients are asked whether they would recommend their hospital to friends and family, and to give an overall rating of their hospital. These are standard customer satisfaction questions used across many industries (Farris et al 2010), and they provide two complimentary measures of patients' assessments of their hospitals. The data are aggregated at the hospital level, reporting the percentage of patients at each hospital giving a "high" rating (9 or 10 out of 10), moderate rating

[4] This excludes hospitals that do not provide treatment for acute physical illness: long term care hospitals and institutions for psychiatric illness, mental retardation, alcoholism and other chemical dependencies. Data on the number of such hospitals in the US is from the Kaiser Foundations's State Health Facts database [Link].

(7-8 out of 10), or low rating (0 to 6). It is clear from Table 1 that patients are quite favorable to their hospitals; the modal response is a 9 or 10 out of 10, with 65 percent giving this high rating. Only 10 percent of patients seem clearly dissatisfied. Likewise, 68 percent say they would "definitely" recommend their hospital, while only 6 percent say they would definitely *not* recommend.

Hospital Death Rate. Patient mortality looks at whether Medicare patients died within 30 days of their hospital admission. The measure includes patients initially admitted for heart attack, heart failure, and pneumonia. The mortality rates are also severity-adjusted to control for how sick patients were at their time of admission. For example, patients with more severe symptoms, a history of heart disease, who are older and arrive in the hospital with co-morbidities such as diabetes, malnutrition, or liver disease, are more likely to die regardless of the quality of medical care. This severity-adjustment aims to identify hospital-specific mortality – whether the hospital has a better or worse death rate than average controlling for its mix of patients.[5] The hospital death rates are released as a three-year average, which serves to smooth out random year-to-year variation. The overall hospital death rate in these data is 13 percent (and ranges from x% to z%).

Technical Medical Quality. Medical quality is based on adherence to standards of care for heart attack, heart failure, pneumonia, and general surgical practice. Measures were selected by the National Quality Forum, an independent advisory board made up of doctors, nurses, hospital administrators, and other stakeholders. The 24 measures of technical medical quality were selected for their relevance to health outcomes, reliable measurability, and need for national improvement in medical practice. The data provide important indicators of the hospital medical

[5] For more information, see Medicare's information for professionals website http://www.hospitalcompare.hhs.gov/%28X%281%29S%281pgb0t2rmzfsdb3xk5r2zp45%29%29/staticpages/for-professionals/ooc/statistcal-methods.aspx

environment – how swiftly and reliably hospitals act to treat acute illness and uphold patient safety.

For heart attack care, the measures record whether and how quickly patients are given medication to dissolve blood clots or reduce blood pressure. If coronary surgery is needed, is it performed within two hours of admission? For pneumonia, the measures focus on the timeliness of treating with antibiotics, whether blood tests were taken prior to administering antibiotics, whether the patient's blood oxygen level was evaluated, and whether the most appropriate antibiotic was selected. Measures of surgical care focus on the prevention of infection, and the appropriate use and selection of preventative antibiotics. For heart failure, measures include whether a test was given for how well the heart is pumping blood (e.g., electrocardiogram, chest x-ray) and whether proper medication was given in the case of heart dysfunction.

The full list of quality measures appears in Appendix I. Many of these quality measures are being incorporated into new operating room checklists in an effort to ensure that the fundamentals are done correctly every time, without error (Gawande 2009).

Hospitality. The "room and board" aspects of hospital care are measured from a battery of items in the HCAPS patient survey. The quality of nurse communication is based on three items: treating the patients with courtesy and respect, listening carefully to them, and explaining things in ways patients can understand. Nurses have a central role in patient safety and medical quality, and their work is crucial to both our measure of technical medical quality and patient mortality. However, what patients regard as good nursing may not be closely connected to a nurse's medical performance.

In large scale research on what patients regard as good nursing, the most common factors include spending time with patients, touching patients (e.g., on the arm for reassurance), talking

with them, and "doing little things without being asked" (Lynn et al 2007:163; Larrabee and Bolden 2001). "Specific technical skills of the nurses were never mentioned because… patients perceived the technical competence of the nurses as a given" (Lynn et al 2007:165). In short, patients generally evaluate nurses by the standards of a friendly and caring personal assistant, and give little conscious attention to, or take for granted, their technical medical role. Our view is that the medical role of nurses is largely captured in the quality and mortality measures, while their hospitality role is captured by the nurse communication measures.

Other measures include pain control (did patients feel their pain was well controlled, and did staff do "everything they could" to help with pain management?), giving information about "what to expect during [the patients'] recovery at home," whether the rooms were kept clean, and whether the rooms were quiet at night.

There are two potential concerns with the measurement of hospitality. First, patients contemporaneously report both on hospitality and their overall satisfaction with the hospital, which may lead to a mixing together of the responses. Respondents may think, "I just said that the rooms were noisy and the nurses were unkind, so I guess I did not like the hospital." Ideally, we would use a kind of Zagat rating of hospitals to provide third party evaluation of the hospitality aspects. Our solution is to look at whether a hospital has a track record for hospitality. Specifically, we use *past* patients – patient responses from the previous year – as the third party evaluators of hospitality.[6] This creates a higher degree of independence between the hospitality measurement and patient satisfaction.

Second, it is difficult to make a strict and clear distinction between hospitality and medical quality. In particular, good communication and explaining things to patients may be considered medical quality in that it may lead to improved patient health in ways that are not

[6] Thus, the hospitality data are for the period July 2006 to June 2009.

already captured by the technical quality and patient mortality variables. We believe that these measures *primarily* reflect hospitality, but cannot entirely rule out the potential for their medical benefits.

Methods

We estimate the relationship between the quality of medical care and patients' satisfaction with and willingness to recommend their hospital. Since the hospital death rate is a three-year average, we analyze the data as a single cross-section averaged over three years. With two outcome variables, we have two equations:

$$Satisfaction_{it} = \delta_1 + \alpha_1 Quality_{it} + \boldsymbol{Z_{t-1}\beta_1'} + \boldsymbol{X_t\gamma_1'} + \upsilon_{it} \quad (1)$$

$$Recommendation_{it} = \delta_2 + \alpha_2 Quality_{it} + \boldsymbol{Z_{t-1}\beta_2'} + \boldsymbol{X_t\gamma_2'} + \eta_{it} \quad (2)$$

In each model the subscript *i* denotes the hospital, while the subscript *t* denotes the time period (*t* = 2007-10; *t-1* = 2006-09). $Quality_{it}$ represents the technical quality of medical care at hospital *i* at time *t*. **Z** is a vector of variables capturing the lagged "room and board" quality of hospitals. **X** is a vector of hospital- and state-level control variables. The terms υ_{it} and η_{it} are random disturbances associated with the respective outcome variables.

Given that both equations include the same set of right-hand side variables, they can be pooled and estimated jointly within one model.[7] Pooled regression is similar to a panel study in which hospitals are observed at two different time periods; in this case, however, hospitals are observed on two similar outcomes at one time. Technically, this creates a hierarchical data

[7] Another approach could be to simply average the two outcome variables, although this has the effect of reducing the amount of analyzable information. The pooled analysis preserves the full information, allowing analysis of differences between outcome variables (ie, differences across questions).

structure in which observations are nested within hospitals. As the error terms (υ_{it} and η_{it}) are likely to be correlated within hospitals (which generates misleading standard errors), we use the random effects model – generalized least squares – rather than pooled OLS. Writing the above two equations as one jointly-estimated model,

$$Y_{ito} = \delta + \alpha Quality_{it} + \boldsymbol{Z_{t-1}}\boldsymbol{\beta'} + \boldsymbol{X_t}\boldsymbol{\gamma'} + \varepsilon_{ito} \quad (3)$$

where the subscript *o* denotes the specific outcome; when o=1, the outcome is patient satisfaction, and when o=2 the outcome is patient recommendation.

We separately analyze high and low levels of patient satisfaction and willingness to recommend. Patient satisfaction is represented by three variables: the percent with "high" satisfaction (9-10 out of 10), the percent with "medium" satisfaction (7 – 8 out of 10), and the percent with "low" satisfaction (0 to 6 out of 10). These variables sum to one for each hospital, and we use high and low satisfaction to analyze all the informative variation.[8] This is a byproduct of hospital-level, rather than individual-level, measurement. This does, however, give a natural way of testing whether *positive* evaluations are generated by the same basic process as *negative* evaluations. We report these as positive response models and negative response models. If the same processes that produce positive responses are also generating negative responses, the negative response models should yield approximately the same results as the positive response models, but with opposite-signed coefficients.

Finally, our outcome variables are not completely continuous, but rather are percentages bounded between zero and one. Fractional regression is designed for this type of data. As Papke and Wooldridge (1996:620) note, "the drawbacks of linear models for fractional data are analogous to the drawbacks of the linear probability model for binary data". In additional results

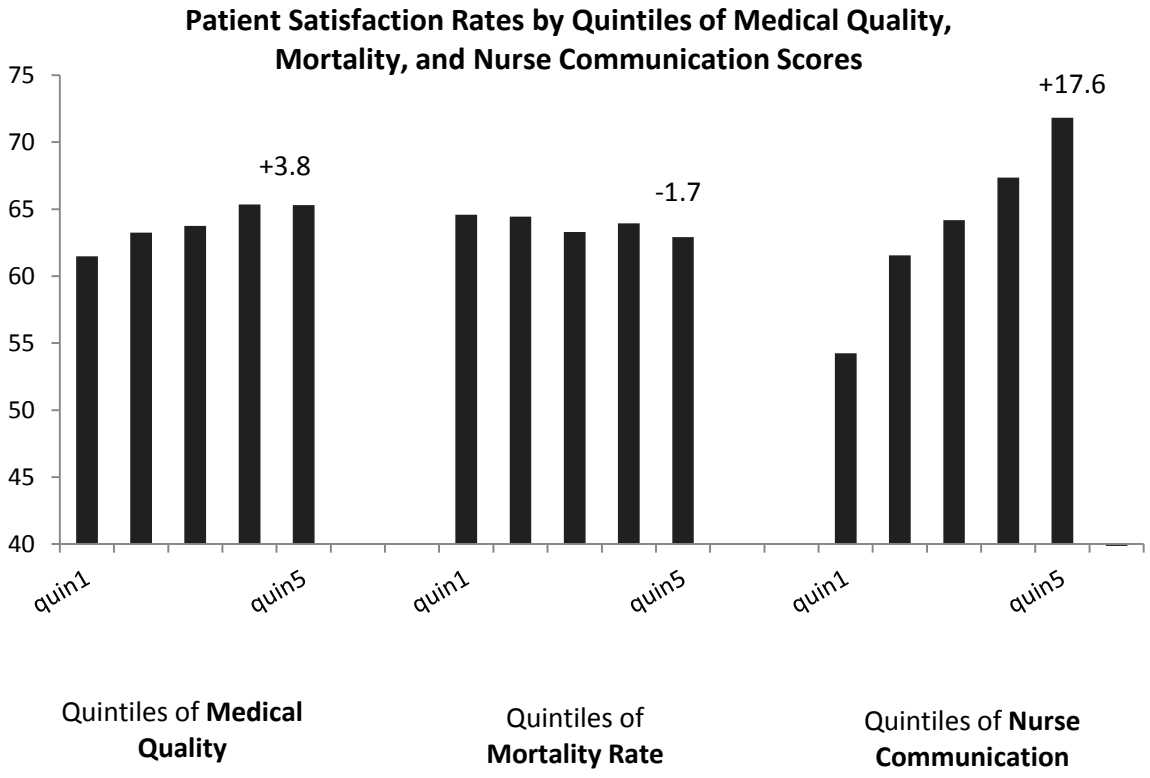
[8] Studying variation in moderate satisfaction is redundant, as the values for moderate satisfaction are fully determined by the values of the other two variables.

available upon request, we apply fractional regression to these data, and find substantively similar results. For the main text, we focus on the simpler OLS models that are clearer and more transparent to readers (Glaser 2008).

Findings

For an initial look at the data, Figure 1 graphs patient satisfaction by quintiles of medical quality, patient mortality, and nurse communication. This shows that patient satisfaction is somewhat higher in the top quintiles of medical quality (3.8 percentage points higher than in the lowest quintile of medical quality). Hospitals with low death rates also have higher levels of patient satisfaction. However, the difference is very small. Hospitals in the top quintile of patient mortality have only 1.7 percentage points less satisfaction than hospitals with the lowest death rates. A natural concern here might be that high-mortality hospitals are effectively 'burying the evidence': dead patients are unable to register their dissatisfaction with the hospital. These findings are limited to what surviving patients learned about their hospital. The evidence indicates that surviving patients do not have much awareness of their hospital's patient safety standards.

Nurse communication has a much stronger relationship with patient satisfaction. The difference between the top and bottom quintiles of nurse communication is 17.6 percentage points of patient satisfaction. This suggests that the quality of interaction with nurses has nearly five times as much influence on patient satisfaction than technical medical quality, and ten times as much influence as the hospital death rate. This strongly supports the hypothesis that aspects of care that are more visible to patients primarily shape patient satisfaction.



Source: Medicare Hospital Data, 2006-10.

On this background, we apply our full models relating both medical quality and hospitality to patient satisfaction. The left half of Table 2 shows the *positive response* models, which estimate the determinants of a hospital receiving positive evaluations from a larger proportion of patients. Model 1 shows the bivariate relationship between patient satisfaction and the technical quality of medical care. This shows that medical quality and patient satisfaction move together in the same direction. Model 2 adds in hospitality variables as well as hospital-level and state-level controls. The effect of technical quality is reduced but remains positive and significant. The beta coefficient indicates that a one standard deviation increase in medical quality leads to a 0.13 standard deviation increase in patient satisfaction. Satisfaction is much

more sensitive to the quality of nurse communication; the beta coefficient (0.33) is roughly three times the magnitude of the coefficient for medical quality. Most of the other hospitality variables (the quietness and cleanliness of the rooms, pain management, and information about recovery at home) have standardized coefficients of roughly similar magnitudes to medical quality.

Model 3 and 4 use hospital mortality as the measure of technical medical quality. Death rates have a somewhat weaker association with patient satisfaction. A one standard deviation increase in the hospital death rate leads to a 0.08 standard deviation drop in satisfaction. The beta coefficient for nurse communication (0.38) is more than four times as large in absolute magnitude. Most of the other hospitality variables have effect sizes higher than the magnitude of the mortality rate.

[Table 2: OLS Regression: Effects of Medical Quality on Patient Satisfaction]

New order of models: first, mortality, then quality

Table 2: OLS Regression Effects of Medical Quality on Patient Satisfaction

	Positive Response MODEL				Negative Response MODEL			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	BETA (se)	BETA (se)	BETA (se)	BETA (se)	BETA (se)	BETA (se)	BETA (se)	BETA (se)
Technical Quality								
Quality of medical care	0.15*** (0.03)	0.13*** (0.02)			-0.13*** (0.02)	-0.12*** (0.01)		
Mortality rate			-0.08*** (0.13)	-0.08*** (0.07)			0.02 (0.06)	0.02** (0.03)
Hospitality								
Nurse communication		0.33*** (0.04)		0.38*** (0.04)		-0.47*** (0.02)		-0.50*** (0.02)
Quiet room		0.16*** (0.01)		0.13*** (0.02)		0.08*** (0.01)		0.06*** (0.01)
Clean room		0.14*** (0.02)		0.11*** (0.02)		-0.10*** (0.01)		-0.08*** (0.01)
Pain management		0.09*** (0.04)		0.06 (0.05)		-0.09** (0.02)		-0.03 (0.02)
Information about recovery at home		0.08*** (0.03)		0.12*** (0.03)		-0.12*** (0.01)		-0.15*** (0.01)
Other Hospital Characteristics								
Ownership								
Government-Owned (reference category)		…		…		…		…
Private, non-profit		0.05*** (0.26)		0.08*** (0.26)		-0.01 (0.11)		-0.03** (0.10)
Private, for-profit		0.03* (0.32)		0.06*** (0.32)		0.05*** (0.14)		0.01 (0.14)
Price ($) / 1000		0.24*** (0.03)		0.30*** (0.03)		-0.10*** (0.01)		-0.14*** (0.01)
Emergency service		-0.03* (0.46)		0.01 (0.50)		-0.01 (0.19)		-0.02 (0.20)
Survey response rate		0.24*** (0.01)		0.25*** (0.02)		-0.14*** (0.01)		0.17*** (0.01)
State-Level Controls Included?	N	Y	N	Y	N	Y	N	Y
Constant	--*** (2.94)	-- (15.52)	--*** (1.63)	--*** (15.98)	--*** (1.48)	--*** (5.73)	--*** (0.76)	--*** (5.90)
R^2	0.023	0.663	0.007	0.614	0.018	0.566	0.000	0.547
Observations	6,360	6,360	6,038	6,038	6,360	6,360	6,038	6,038

Notes: *p≤.05, **p≤.01, ***p≤.001 (two-tailed tests). Robust standard errors in parentheses.

The right half of Table 2 reports on the negative response models: the likelihood of hospitals receiving negative evaluations from a larger proportion of patients. Recall that if the same causal processes generate both positive and negative patient responses, then coefficients in the negative response models should have the opposite signs as in the positive response models.

The technical quality of medical care has a similar effect on negative responses as on positive responses. In model 6, a one-standard-deviation increase in quality leads to a 0.12 standard deviation drop in negative feelings about a hospital. The effect of nurse communication is roughly 4 times the magnitude of medical quality.

In models 7 and 8, we see that the mortality rate has a very weak link to patient dissatisfaction. A one standard deviation increase in the death rate leads to only a .02 standard deviation increase in dissatisfaction (in model 8). In contrast, increasing the quality of nurse communication by one standard deviation leads to a large drop in dissatisfaction (.50 standard deviation). This effect is 25 times the absolute magnitude of the effect of the hospital death rate. The effects of clean room and information about recovery at home are also several times larger in absolute magnitude as the death rate. When patients complain about their hospitals, it is primarily due to the room and board aspects of their stay (and especially the personal interaction with nurses).

Overall, the main conclusion is that standard-unit increases in the hospitality aspect of care have a much greater effect on patient satisfaction than standard-unit increases in patient safety or technical medical quality. Auxiliary regressions on medical quality itself (not reported) reinforce this picture. For example, hospitals with 10 percent higher quality of nurse communication have 1.5 percent higher medical quality, but 6.6 percent higher patient satisfaction. Hospitality is not a *negative* signal for medical quality (as, for example, if bad

hospitals compensate by investing in greater hospitality), but it is a *distracting* signal for patients that leads to exaggerated swings in evaluations of care. A profit-maximizing hospital aiming to increase patient satisfaction would look first to relatively superficial hospitality aspects of care. Hospitality is the fast track to customer satisfaction in medicine.

Discussion

Given the relative importance of medical services and hospitality in actual health outcomes, why are the hospitality services so central to patient experience?

Visibility of services: This problem – the relative observability of hospitality and medical excellence – also shapes what hospitals must do to compete for patient satisfaction and customer loyalty.

The marketization of medicine exacerbates the limited information problem. As hospitals advertise their hospitality services, they structure patient expectations and train their eyes on these softer services. This move by hospitals draws on the rhetoric of patient centered care to add legitimacy to the more hospitality orientation.

In a consumerist model of medicine, hospitals face an incentive to provide forms of care more visible to patients. Technical quality and patient safety may be de-prioritized and even crowded out by market forces that reward hospitality more than medical quality.

While the current analysis cannot directly test the marketization account of customer service rating, we would expect to find variation by competitive context. To test this possibility we conducted a secondary analysis.

Hospital Competition

This study also examines both sides of the market: patients as consumers, and *hospitals as competitors*.

Competition for customer loyalty and patient dollars is one of the mechanisms by which market-driven health care is expected to improve quality (Herzlinger 1997; 2004). Hence, it is important to ask how hospital market competition itself shapes medical care. In more competitive hospital markets, is medical quality higher? Is customer satisfaction higher?

In many places in the country, there is a high local concentration of hospitals which are all potentially serving the same patients. In many cases, "hospitals have found themselves in a fierce fight… pitted against other hospitals, pulling out all stops to maintain market share" (Griffen 2006:217). How do hospitals respond to the pressures of competition?

Given that local market competition tends to raise costs, create excess capacity, and reduce economies of scale (with fewer patients per hospital), competition may not have a positive impact on hospital care (Starr 1982; Gaynor 2006; Mutter, Wong, and Goldfarb 2008). Nevertheless, competition may provide effective incentives and pressures to perform better. Facing rivalry from other hospitals, do competitors make greater efforts to improve medical quality, "room and board" hospitality, or both?

The McKinsey Institute estimates that about 40 percent of commercially-insured patients have asked their doctor for a specific hospital to undergo treatment. They also find that nearly a third of doctor say they would honor patient requests for a lower quality hospital that was known for hospitality (Grote, Newman, and Sutaria 2007). And there is increasingly prolific direct-to-patient hospital advertising, with some $1.2 billion spent on advertising each year (Newman

2009). Hence, there is significant scope for "consumer-driven competition" among hospitals, and for patient loyalty and enthusiasm to be an economic asset for hospitals (Herzlinger 2004:110).

When competition is intense, which aspects of care do hospitals devote their limited resources to? Do they focus on improving what is most readily observable to patients? If so, this could generate a feedback loop for continuously improving room-and-board hospitality: as hospitals improve their "comfort care," they gain a growing market advantage, pushing other hospitals to imitate the market strategy. However, if medical quality is not observable for patients, then hospitals may not compete as much on the basis of clinical excellence.

To obtain data on the competitive environment facing hospitals, we merged in data from the Health Care Cost and Utilization Project, using the latest (2003) hospital market structure files. Competition, therefore, is measured with a roughly five-year lag relative to other hospital characteristics. We expect that the degree of local market competition changes slowly over time, so that the 2003 data still provides a relatively good measure of competition in 2007-10.[9] Matching hospitals across data sets proved difficult, and only 331 hospitals could be matched with competition data. Thus, testing the effect of competition can only be done using a sub-set of the data. We tested the representativeness of the sub-sample by checking whether our main findings (form the previous section) can be replicated on the sub-sample; virtually none of the coefficients show a statistically significant difference between the full sample and the sub-sample (Clogg et al 1995).[10]

Market competition is a classic case of model uncertainty (Young 2009): the Health Care Cost and Utilization Project data include 18 different measures of local hospital competition (the presence of other hospitals that may draw away patients). All of them are anchored around

[9] Measurement error in the competition variables (due to the roughly five-year time lag) will tend to bias the estimates toward zero (Hausman 2001). Thus, the measurement lag makes this a conservative test.
[10] These test results are available from the authors on request.

measuring “the spatial density of hospitals” (Scott et al 2000:127), including different ways of defining local market boundaries (political boundaries, fixed radius, variable radius, and patient flow) and different measures of the intensity of competition within the local area (number of hospitals, Herfindahl index) (Wong, Zhan, and Mutter, 2005). Rather than trying to select one or two preferred measures, we use all measures, testing them one at a time, and consider the weight of the evidence.

There are 18 measures of competition, and three outcome variables (positive response, negative response, and medical quality). Appendix 2 shows the key coefficients of interest from 54 regression models, while Figure 4 graphs these results.

For positive satisfaction responses, the signs on competition are positive in all 18 measures, and significantly so in 14. The weight of the evidence clearly supports that competition increases patient satisfaction. Looking at negative responses, when people are explicitly unhappy with their hospital, the signs indicate that competition reduces patient discontent for 16 measures, though the coefficients are small and only significant for two measures. This suggests that competition may reduce patient dissatisfaction, but the effect is probably too small to matter.

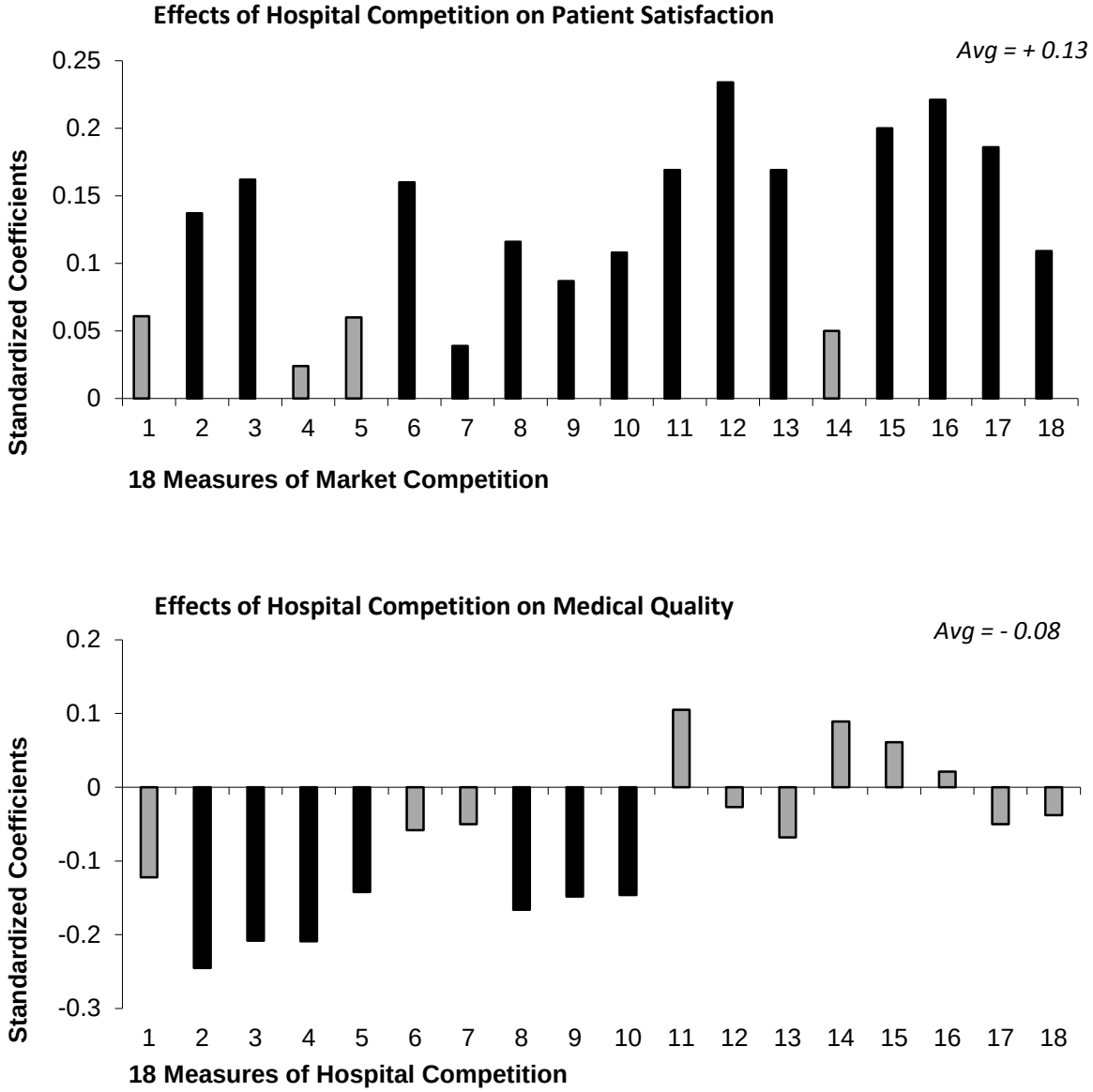
For medical quality, the signs on competition are negative in 14 out of 18 coefficients, and significantly so for 7 of those. Though not definitive, the balance of evidence suggests that medical quality is lower in areas with more competition among hospitals.

Additional results (not reported) show that in the subset of data for which competition data are available, the baseline results – the effects of medical quality and hospitality – are very similar to those reported above in Tables 2. This suggests that the smaller sample is representative of the full data set. Moreover, the interaction effect of competition and medical

quality has a clear zero coefficient, indicating that patients' ability to identify the quality of their hospital does not depend on the level of market competition. In other words, more intense market competition does not improve the flow of information in hospital markets, nor lead the best hospitals to more effectively signal their quality to patients.

In summary, local competition among hospitals leads to higher patient satisfaction, but seemingly lower medical quality.

Figure 4. Estimates of the Effect of Competition on Satisfaction and Quality, Across 18 Measures of Hospital Competition



Note: Coefficients that are significant at least at the 5% level are shown in black. Non-significant coefficients are shown in grey.

There seems to be a relatively strong feedback loop between hospitality, patient satisfaction, and market competition. The ready conversion of hospitality into patient satisfaction makes this a natural focal point for hospital competition. In contrast, there are only weak connections between medical quality, patient satisfaction, and competition. This creates potential for market-driven health care to continuously improve the hospitality aspect of care, with no strong mechanism for improving technical medical quality. Neither consumerism nor competition provides a mechanism that strongly supports medical quality. Both push hospitals towards increasing hospitality and patient satisfaction, independently of medical quality.

Conclusion

Revisit the question of relative importance:

For patients, both hospitality and medical quality matter at some level but the hospitality elements have a much more powerful effect on patient satisfaction. This effect is heightened in more competitive contexts.

Hospitals balance two aspects of patient care. First is technical medical quality, which represents the reason why patients are under their care. The second is hospitality treatment – maintaining patient comfort during their stay. Hospitality experiences are mostly tangential to patients' long-term well-being, but are a visible and memorable aspect of their hospital experience.

Drawing on a sample of over 3,000 American hospitals, this research finds that patients have limited ability to observe the technical quality of their medical care, but are very sensitive to the quality of room and board care. Raising medical quality by 10 percent leads to only a 1.3 percent increase in positive reports of satisfaction or in willingness to recommend the hospital.

When patients are explicitly unhappy with their hospital, the quality of medical care seems even less important. In contrast, the hospitality/'room and board' care is a key driver of patient satisfaction. The quality of interaction with nurses has an effect size some three times larger than medical quality. Even relatively minor customer service aspects, such as the quietness of rooms, have as much or more impact on patient satisfaction than does medical quality.

Some of what we label hospitality may have medical benefits that are not captured in the mortality or medical quality variables, but our central conclusion is that consumer evaluations of hospitals primarily focus on hospitality. This carries great potential to distract both patients and hospitals from the core mission of medical excellence. In a medical market with more high-charged incentives, competition for patients may lead hospitals to focus on what their consumers can immediately observe, and skimp on what they cannot. In a truly market driven ("consumer driven") health care market, we expect to see developments such as 24-hour room service, restaurant-quality meals, HBO channels, non-medical staff to tend to patient comfort, hospital executives recruited from the service industry, and growing capital investments in waterfalls, WiFi, atriums, and private rooms. Patients suffering through the pains and discomforts of medical treatment will greatly appreciate a higher standard of hospitality. However, this same movement may lead to cutbacks in what medical consumers cannot readily observe: the provision of excellent medical treatment. Over time, hospitals may become increasingly comfortable places to stay, but less-than-ideal places to undergo medical treatment. This is a market driven health care that turns hospitals into hotels (Goldman and Romley 2008).

This is the theme of a recent award winning book, *If Disney Ran Your Hospital: 9 ½ Things You Would Do Differently* (Lee 2004). Hospitals, the author argues, must recognize that, like Disney, they are providing an "emotional experience". In this, perceptions are more

important than reality, and the perceived experience of the visit is more important than the medical services provided. Drawing on the principles of a Disney production, Lee focuses on how hospitals can cultivate a competitive advantage in hospitality.[11]

As a business strategy, investing in hospitality and amenities seems to offer a higher return than medical quality. If hospitality and medical care had the same per-unit costs, hospitality investments would generate far more patient loyalty than would better medical care.

The pursuit of customer satisfaction, particularly when patients have only partial insight into quality, seems to drive medicine in the wrong direction. By focusing on customer satisfaction, hospitals can develop hotel amenities and services that improve their customer ratings without improving medical quality.

By training the attention spotlight on customer satisfaction, hotel amenities and comfort experiences can change the priorities of the health care system. The risk is a future of health care that is more comfortable than helpful, and more expensive than effective.

Moreover, turning hospitals into hotels makes medicine a private consumer good that the public sector has no business subsidizing. If medicine is more and more about hospitality, then it is less of a "public good" and properly should be an out-of-pocket expense. Medicine as hospitality is separate from social insurance, Medicare, or Medicaid. In this sense, the private market for medicine naturally moves towards high-deductible insurance and out-of-pocket spending by patients-as-consumers (Reed et al 2009). Hospitality diminishes the reason for public funding and support of health care.

[11] *If Disney Ran Your Hospital* won the 2005 best book award from the American College of Healthcare Executives, and claims to have sold over 250,000 copies.

Table 1. Descriptive Statistics

Variable	N	Mean	s.d.	Minimum	Maximum
Dependent Variables					
Overall ratings (9 or 10, high, %)	3180	64.5	8.9	25.3	96.0
Overall ratings (6 or lower, low, %)	3180	10.2	4.6	0.0	43.7
Recommendation (yes, definitely, %)	3180	67.8	10.0	25.3	97.0
Recommendation (no, not, %)	3180	6.1	3.5	0.0	36.7
Quality of Medical Care					
Overall quality of care	3180	90.7	7.0	29.5	99.5
Mortality rate	3019	12.8	1.4	7.9	17.7
Hospitality (one-year lag)					
Nurse communication	3180	73.2	6.7	35.0	98.0
Quiet room	3180	55.1	10.7	29.5	95.0
Clean room	3180	68.0	7.7	40.5	93.5
Pain management	3180	67.7	5.9	35.5	93.0
Information about recovery at home	3180	79.8	5.4	0.0	96.0
Responsiveness of hospital staff	3180	60.8	8.9	31.0	96.5
Communication about medicine	3180	58.1	6.6	15.0	92.0
Hospital Characteristics					
Price($)/1000	3180	12.3	3.8	2.5	32.2
Ownership					
Government	3180	0.19	0.39	0	1
Nonprofit	3180	0.62	0.48	0	1
Profit	3180	0.19	0.39	0	1
Emergency service (yes=1)	3180	0.94	0.24	0	1
Response rate (%)	3180	32.9	9.3	6.3	91.0
State Characteristics					
Education (% of population with bachelor's or higher degree)	3180	27.0	4.5	17.3	49.2
GDP Per Capita (logged)	3180	10.6	0.1	10.3	11.2
Population density (logged)	3180	5.0	1.0	0.2	9.2

Source: Medicare Hospital Data, July 2007 to June 2010. Hospitality variables: July 2006 to June 2009. State characteristics data from American Community Survey by the U.S. Census Bureau (Education from the 2006-2010 five year estimates data; GDP Per Capita and Population density from 2008, 2009, and 2010 data).

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Appendix I. Technical Medical Quality Indicators (Process of Care Quality Measures)

Heart Attack

Aspirin at Arrival
Aspirin Prescribed at Discharge
ACEI or ARB for LVSD
Adult Smoking Cessation Advice/Counseling
Beta Blocker Prescribed at Discharge
Beta Blocker at Arrival
Median Time to Fibrinolysis
Fibrinolytic Therapy Received Within 30 Minutes of Hospital Arrival
Median Time to Primary PCI
Primary PCI Received Within 90 Minutes of Hospital Arrival

Heart Failure

Evaluation of LVS Function
ACEI or ARB for LVSD
Adult Smoking Cessation Advice/Counseling
Discharge Instructions

Pneumonia

Oxygenation Assessment
Pneumococcal Vaccination
Blood Cultures Performed Within 24 Hours Prior to or 24 Hours After Hospital Arrival for Patients Who Were Transferred or Admitted to the ICU Within 24 Hours of Hospital Arrival
Blood Cultures Performed in the Emergency Department Prior to Initial Antibiotic Received in Hospital
Adult Smoking Cessation Advice/Counseling
Antibiotic Timing (Median)

Surgical Care

Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision
Prophylactic Antibiotic Selection for Surgical Patients
Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time
Surgery Patients with Appropriate Hair Removal

Appendix II: Effects of Competition Measures on Patient Satisfaction and Medical Technical Quality

	Positive response	Negative response	Overall quality
Number of Hospitals	*Coef.* *(p)*	*Coef.* *(p)*	*Coef.* *(p)*
Core-Based Statistical Area	*0.588* *(0.070)*	*-0.195* *(0.275)*	*-0.580* *(0.090)*
County	*1.267*** *(0.000)*	*-0.224* *(0.219)*	*-1.382*** *(0.002)*
Health Service Area	*1.491*** *(0.000)*	*-0.314* *(0.064)*	*-1.173*** *(0.004)*
Metropolitan Statistical Area	*0.262* *(0.396)*	*-0.014* *(0.940)*	*-1.035** *(0.013)*
Fixed Radius	*0.498* *(0.132)*	*0.007* *(0.969)*	*-0.769** *(0.034)*
Variable Radius 75%	*1.463*** *(0.000)*	*-0.317*** *(0.007)*	*-0.314* *(0.173)*
Variable Radius 90%	*0.296* *(0.058)*	*0.053* *(0.408)*	*-0.242* *(0.091)*
Patient Flow 75%	*1.020*** *(0.001)*	*-0.055* *(0.728)*	*-0.912** *(0.022)*
Patient Flow 90%	*0.764** *(0.013)*	*-0.099* *(0.538)*	*-0.815** *(0.039)*
Patient Flow 95%	*0.914*** *(0.003)*	*-0.226* *(0.168)*	*-0.801** *(0.049)*
Herfindahl Index			
Core-Based Statistical Area	*1.623*** *(0.000)*	*-0.299* *(0.059)*	*0.516* *(0.190)*
County	*2.128*** *(0.000)*	*-0.312* *(0.067)*	*-0.147* *(0.671)*
Health Service Area	*1.439*** *(0.000)*	*-0.194* *(0.142)*	*-0.365* *(0.288)*
Metropolitan Statistical Area	*0.405* *(0.113)*	*-0.125* *(0.389)*	*0.426* *(0.113)*
Fixed Radius	*1.741*** *(0.000)*	*-0.175* *(0.261)*	*0.338* *(0.450)*
Variable Radius 75%	*1.972*** *(0.000)*	*-0.348** *(0.011)*	*0.117* *(0.727)*
Variable Radius 90%	*1.620*** *(0.000)*	*-0.205* *(0.143)*	*-0.276* *(0.562)*
Patient Flow	*0.964*** *(0.000)*	*-0.009* *(0.948)*	*-0.203* *(0.582)*

Note: *p≤.05, **p≤.01, ***p≤.001 (two-tailed tests).

Notes to appendix II: The satisfaction models include all variables in main models (models 2 and 6 in Table 2). The medical quality models include variables for all hospital characteristics include teaching status, region, urban/rural, ownership, and bed size. To save space, full results are not reported here, but available from the authors on request. The Herfindahl Index is reverse coded (1 – index), so that larger values show greater (not lesser) intensity of competition. This transformation only affects the signs of the coefficients. All measures of competition are standardized. Table reports standardized coefficients with p-values in parentheses.