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DOI: 10.1111/1475-6773.12549
RESEARCH ARTICLE

Hospital Advertising, Competition, and HCAHPS: Does It Pay to Advertise?

*John W. Huppertz, R. Alan Bowman, George Y. Bizer,
Mandeep S. Sidhu, and Colleen McVeigh*

Objective. To test whether hospital advertising expenditures predict HCAHPS global ratings.

Data Sources/Study Setting. We examined media advertising expenditures by 2,142 acute care hospitals in 209 markets in the United States. Data on hospital characteristics, location, and revenue came from CMS reports; system ownership was obtained from the American Hospital Association. Advertising data came from Kantar Media. HCAHPS data were obtained from HospitalCompare.

Study Design. Regression models examined whether hospitals' advertising spending predicts HCAHPS global measures and whether market concentration moderated this association.

Data Collection/Extraction Methods. Hospital advertising spending was calculated by adding each individual hospital's expenditures to the amount spent by its parent health system, proportionally allocated by hospital revenue. Health system market share was used to estimate market concentration. These data were compared to hospitals' HCAHPS measures.

Principal Findings. In competitive markets (HHI below 1,000), hospital advertising predicted HCAHPS global measures. A 1-percent increase in advertising was associated with a 1.173-percent increase in patients rating the hospital a "9" or "10" on the HCAHPS survey and a 1.540-percent increase in patients who "definitely" would recommend the hospital. In concentrated markets, this association was not significant.

Conclusions. In competitive markets, hospitals that spend more on advertising earn higher HCAHPS ratings on global measures.

Key Words. Advertising, HCAHPS, health systems, hospitals

The linkage of HCAHPS to Medicare funding through CMS's Value-Based Purchasing program has prompted a wave of initiatives by hospitals to improve their HCAHPS scores. These mostly involve programs to educate nurses, physicians, and support staff on how to interact with patients to deliver an optimal inpatient experience, and because financial incentives are tied to

HCAHPS performance, the return on these projects' investments is readily calculated (e.g., Weech-Maldonado et al. 2012; Merlino and Raman 2013; Petruccio et al. 2013; McClelland and Vogus 2014).

However, hospitals might also influence their HCAHPS scores through the amount they spend on advertising. A positive correlation between firms' advertising spending and their customer satisfaction scores has been found in marketing studies conducted among firms in multiple industries (Samaraweera and Gelb 2011; Rego, Morgan, and Fornell 2013; Lee and Park 2015), but the relationship has not been investigated in health care settings. Research in marketing has shown that advertising increases brand preference and trust in the firm, which in turn influences consumers' satisfaction with the brand (San Martin and Camarero 2005; Li and Miniard 2006). Additionally, favorable scores on satisfaction surveys may prompt brands to increase advertising expenditures to promote their customers' good experiences, and thus advertising serves as a quality signal to prospective customers (Milgrom and Roberts 1986).

In this study, we examine the extent to which hospitals' advertising spending predicts their HCAHPS survey results. We propose that in markets where patients have choices among rival hospitals, advertising's brand-building effects may influence a hospital's HCAHPS scores by increasing consumers' preference for that hospital, and we use marketing theory and research to hypothesize that the combination of advertising exposure and direct experience will be associated with higher HCAHPS scores in competitive markets. We test this proposition by fitting a model of advertising spending data and HCAHPS scores for hospitals in the United States.

Hospital Advertising

Since the end of prohibitions against advertising for health care services, hospitals have devoted funds to marketing directly to consumers. In 1979, approximately 20 percent of hospitals engaged in some direct-to-consumer advertising (Whittington and Dillon 1979). Barro and Chu (2003) reported

Address correspondence to John W. Huppertz, Ph.D., MBA Healthcare Management Program, Clarkson University, Capital Region Campus, 80 Nott Terrace, Schenectady, NY 12308; e-mail: jhuppertz@clarkson.edu. R. Alan Bowman, Ph.D., is with the School of Business, Clarkson University, Schenectady, NY. George Y. Bizer, Ph.D., is with the Department of Psychology, Union College, Schenectady, NY. Mandeep S. Sidhu, M.D., M.B.A., F.A.C.C., F.A.H.A., is with the Albany Medical College, Division of Cardiology, Albany Stratton VAMC and Albany Medical Center, Albany, NY. Colleen McVeigh, M.B.A., is with Next Wave, Inc., Albany, NY.

that 20 years later, about half of U.S. acute care hospitals used paid media advertising, and the proportion has continued climbing to the present day. According to one estimate, advertising by hospitals, medical centers, and clinics exceeded \$700 million in the first half of 2011 (Rosenthal 2013). These growing expenditures and the high visibility of television commercials, billboards, newspaper advertisements, and interactive media have generated a great deal of commentary, and some critics contend that such spending is not in the patients' best interests (e.g., Finn 2001; Illes et al. 2004; Larson et al. 2005; Oxman 2007; Montefiori 2008; Schenker, Arnold, and London 2014; Stark and Fins 2014). However, proponents maintain that advertising facilitates consumer choice because it informs consumers about services and/or treatments they may not know about, and it helps prospective patients to learn which hospitals might best meet their needs, especially if they have no primary care provider (Babakus and Cavusgil 1988; Bordonaro 2012; Landen 2013).

Hospital administrators have continued to spend funds on advertising, arguing that they must build and hold market share to survive in an increasingly competitive marketplace (Larson et al. 2005; Aiello 2012; Bordonaro 2012). Patient involvement in choosing providers has increased, motivating hospital administrators to use advertising to communicate with patients directly. Consumers have accepted that hospitals advertise; surveys show that most people regard advertising by hospitals as beneficial (e.g., Miller and Waller 1979; Moser and Freeman 2011).

Advertising and HCAHPS

To our knowledge, no research has been conducted on the relationship between advertising and patients' self-reports of their experience, although there is anecdotal evidence of advertising predicting HCAHPS scores. Goldman, Vaiana, and Romley (2010) report that a hospital experienced a 20 percent increase in its HCAHPS "Recommend the Hospital" score after it began advertising luxurious rooms, gourmet meals, and hotel-like services. Muhlestein, Wilks, and Richter (2013) found that over 72 percent of hospitals' website content focused on access or amenities, which they related to patients' perceptions of their experience of care. How advertising expenditures affect patients' responses to HCAHPS survey questions remains unclear, since the surveys are administered after the patient has chosen the hospital, received treatment, and been discharged. However, a theory proposed by Deighton (1984) suggests that a brand's advertisements serve as hypotheses that consumers test by experiencing the product. Consumers do not automatically

accept marketers' advertising claims, but rather regard them tentatively, knowing that such claims are biased in favor of the advertiser, and their experience with the product—either direct experience or independent information about the product's quality—allows consumers to test the claims' validity. Advertising creates positive expectations, serving as a lens through which consumers evaluate information about the product's quality; when individuals are first exposed to advertising and then later experience the quality of a brand, they rate that brand more favorably. This theory was tested in several marketing studies, and the effect was strongest when product quality was ambiguous, that is, when the consumer had little or no objective evidence of product superiority (Deighton 1984; Hoch and Ha 1986; Deighton and Schindler 1988; Ha and Hoch 1989; Smith 1993). These conditions pertain to hospital services because patients find it difficult to assess quality, and even when objective quality data exist, it is unclear and sometimes contradictory (Latham 2004; Rothberg et al. 2008; Austin et al. 2015; Zuger 2015).

We hypothesize that by creating positive expectations through advertising, HCAHPS scores will be higher for hospitals that spend more money advertising to patients. Specifically, the effect should manifest in higher scores on the two HCAHPS measures most closely related to brand evaluations, Overall Hospital Rating and Recommend the Hospital. These specific measures and similar variables in marketing studies have been related to brand evaluations (e.g., Samaraweera and Gelb 2011; Rego, Morgan, and Fornell 2013; McCaughey et al. 2014).

Hospital and System Consolidation

The percentage of hospitals that have merged or become acquired by health systems has increased dramatically. In 1983, 33 percent of hospitals were owned by systems (Business Week 1983); in 2013, 54.2 percent of all registered U.S. hospitals operated in either multihospital or diversified single hospital systems (American Hospital Association 2014). In our sample, which included only acute care hospitals, 69.5 percent of hospitals were owned by health systems, while 30.5 percent were independent.

The trend toward consolidation has had a significant impact on the business of hospitals, including pricing leverage, network structure, negotiations with payers, scale efficiencies, and many other factors (Gaynor and Haas-Wilson 1999; Town and Vistnes 2001; Melnick and Keeler 2007; Moriya, Vogt, and Gaynor 2010). However, little attention has been paid to the effects of consolidation on the advertising done by hospitals, and prior studies of hospital

marketing practices have focused on individual hospitals and their immediate service areas (Kessler and McClellan 2000; Barro and Chu 2003). As hospitals consolidate into larger systems, their combined services penetrate the entire market, which enables administrators to spread their advertising costs over a larger base of patient volume, making it possible for systems to engage in advertising practices that most individual hospitals would find difficult to afford. Thus, large hospital systems can use expensive forms of advertising such as television, which reaches a mass audience in an entire metropolitan area. In addition, hospital systems can establish brand reputations in which their individual hospitals share, and the marketing efficiencies brought about by hospital consolidation may partly explain increases in hospital advertising during the past decade.

Furthermore, in highly competitive markets, patients have more choices among providers, prompting hospitals to invest more resources into marketing to build and maintain market share (Kessler and McClellan 2000; Barro and Chu 2003). We predict that the association between advertising expenditures and HCAHPS scores will be greater in more competitive markets because hospitals' brand strength is more likely to be influenced by advertising, whereas in less competitive markets this relationship will be attenuated.

DATA AND METHODS

Advertising expenditures by acute care hospitals in the United States were obtained from Kantar Media, a commercial firm that tracks organizations' expenditures for television, radio, magazine, newspaper, Internet, and outdoor advertising. The data were reported by Designated Market Area (DMA), a geographic unit established by the Nielsen Company to measure the households reached by advertising, and it is commonly used to buy and sell advertising. DMAs are defined by counties that comprise metropolitan areas, and they closely resemble Metropolitan Statistical Areas.

Because it is more costly to advertise in large versus small markets, we calculated the amount each hospital spent to reach 1,000 households in its DMA (a common measure in the advertising industry known as CPM), resulting in a measure of advertising spending adjusted for market size (Shimp and Andrews 2013). This measure provided an estimate of the amount of hospital advertising that patients were exposed to in the year during which they were hospitalized, regardless of the size of market in which they resided.

HCAHPS scores are reported for each hospital facility. However, in some cases, both a hospital and its parent (multihospital system) make advertising expenditures, such that the individual hospital's advertising is supplemented by expenditures from the parent system. We added a pro-rata portion of the parent system's advertising expenditures to that spent by the hospital itself. In each DMA, each affiliated individual hospital was assigned a percentage of system advertising expenditures equal to the percentage of revenue it contributes to the system, based on the American Hospital Association survey for 2012. After adjusting for market size by calculating the CPM for each hospital, the natural logarithm of advertising spending per thousand households was used in the analysis.

HCAHPS measures inpatient experiences only, so we excluded advertising for nonhospital entities (e.g., clinics, medical groups, outpatient clinics) with the same brand name. The practical effect of this was small, since hospitals and health systems spent far more on advertising than clinics or medical groups.

Patient experience data were obtained from the HCAHPS survey required of U.S. acute care hospitals that receive funding through the Medicare Inpatient Prospective Payment System. Data from surveys of patients discharged from acute care hospitals during the calendar year 2012 were obtained from the HCAHPS website (HCAHPS 2013). HCAHPS measures are patient-mix adjusted for demographics, service line, admission source, self-reported health status, language spoken at home, and survey administration mode (Elliott et al. 2009). We used each hospital's reported top-box scores on two HCAHPS global items, the percentage of patients giving the hospital a "9" or "10" overall rating and the percentage of patients indicating they "definitely" would recommend the hospital to friends or family members (Jha et al. 2008; McClelland and Vogus 2014). Hospitals were excluded if they did not administer HCAHPS surveys (pediatric, specialty, psychiatric, rehabilitation, VA, critical access hospitals), as were hospitals that did not appear in the Kantar Media database.¹ Prior research has found variation in HCAHPS scores by hospital characteristics, including geographic region, bed size, teaching status, profit status, and urban versus rural location (Jha et al. 2008; Elliott et al. 2010; Lehrman et al. 2010), so we included these variables as covariates, along with system ownership of the hospital.

Market concentration was measured in each DMA by calculating the Herfindahl-Hirschman Index (HHI) based on health systems' market share of revenue in 2012 (U.S. Department of Justice and the Federal Trade Commission 1992; Melnick and Keeler 2007). Our HHI calculations differed in two

ways from those used in prior research on hospitals' market concentration (e.g., Town and Vistnes 2001; Town and Currin 2002; Barro and Chu 2003; Moriya, Vogt, and Gaynor 2010). First, HHI was calculated for the entire DMA rather than the individual hospitals' service areas. This was done because advertising expenditures are measured by DMA, and because multi-hospital systems cover multiple service areas in their DMAs. Second, we calculated HHI for multihospital systems instead of individual hospitals, using system as a unit of analysis (Shen, Wu, and Melnick 2010). For system HHI, market share was calculated by combining revenue for all of the system-owned hospitals in each DMA; for independent hospitals that were not owned by a system, market share was calculated using only revenue for the individual hospital.

RESULTS

The final sample included 2,142 hospitals that reported HCAHPS survey results for 2012 and also appeared in the Kantar Media database (Table 1). Overall, the hospitals in this study resemble those of prior HCAHPS research (e.g., Lehrman et al. 2010), which tend to be larger and more likely to be urban, nonprofit, and teaching hospitals.

The average annual amount spent on advertising by each hospital in the sample was \$302,440. The coefficient of variation was 5.86, indicating a great deal of variability. Advertising expenditures were greater among larger, urban, teaching, and private nonprofit hospitals. Hospitals operating in concentrated markets spent less on advertising than hospitals in competitive markets.

Hospitals owned by systems spent more on advertising than independent hospitals (mean \$366,645 vs. \$152,935 per hospital). Adjusting for market size, the advertising CPM expenditures for system-owned hospitals was greater than independent hospitals (mean CPM = \$357.85 vs. \$193.46 per hospital). The differences between independent and system-owned hospitals are partly due to the fact that our estimates of advertising by system-owned hospitals combined the individual hospital's expenditures and a proportional allocation of the parent system's expenditures.

We conducted linear regression analyses using the two global HCAHPS items, Overall Hospital Rating and Recommend the Hospital, as the dependent variables, and the natural logarithm of hospitals' advertising spending, hospital characteristics, and market characteristics as the predictors.

Table 1: Hospital Characteristics, Advertising Expenditures, and Ratings on HCAHPS Global Items

<i>Characteristic</i>	<i>N (%)</i>	<i>Advertising Expenditures Mean (SD)</i>	<i>Percent Rating Hospital "9" or "10" Mean (SD)</i>	<i>Percent "Definitely" Recommend Hospital Mean (SD)</i>
Bed size				
Under 100	757 (34.8)	\$239,547 (595,386)	70.5 (8.2)	72.3 (9.1)
101–200	602 (27.7)	\$292,556 (2,033,567)	69.2 (8.1)	71.1 (9.0)
Over 200	817 (37.5)	\$362,604 (2,307,511)	68.5 (7.9)	70.6 (8.9)
Profit status				
Government	305 (14.2)	\$172,920 (332,173)	68.3 (8.0)	69.8 (8.7)
Nonprofit	1,413 (66.0)	\$378,498 (2,157,983)	69.8 (7.4)	72.0 (8.4)
For-profit	423 (19.8)	\$126,558 (193,779)	68.9 (10.0)	70.1 (10.8)
Urban–rural				
Rural	368 (17.2)	\$51,642 (100,634)	70.1 (8.2)	69.3 (9.7)
Urban	1,774 (82.8)	\$347,033 (1,938,219)	69.2 (8.1)	71.8 (8.8)
Teaching status				
Nonteaching	1,325 (61.9)	\$145,042 (341,475)	69.1 (8.4)	71.1 (9.5)
Teaching	817 (38.1)	\$549,809 (2,814,026)	68.7 (7.4)	71.7 (8.2)
Region				
Northeast	390 (18.5)	\$308,017 (666,793)	65.5 (8.3)	68.5 (9.3)
Midwest	788 (37.3)	\$372,867 (1,900,384)	69.1 (7.5)	70.6 (8.7)
South	554 (26.2)	\$274,446 (2,530,585)	72.1 (7.3)	73.3 (8.4)
West	381 (18.0)	\$178,409 (315,073)	69.1 (8.0)	72.1 (8.9)
System ownership				
Independent	604 (28.1)	\$152,935 (319,472)	70.0 (9.1)	71.6 (10.0)
System-owned	1,544 (71.9)	\$366,645 (2,113,276)	69.3 (7.5)	71.4 (8.5)
HHI—Systems DMA 2012				
Under 1,000	696 (32.5)	\$384,247 (940,379)	68.2 (9.1)	68.2 (9.7)
1,000–1,800	684 (34.9)	\$392,713 (2,941,890)	69.6 (7.7)	69.6 (9.0)
Over 1,800	762 (35.6)	\$138,219 (278,263)	70.3 (7.3)	70.3 (8.3)
Total	2,142 (100)	\$302,440 (1,773,744)	69.4 (8.1)	71.3 (9.0)

Results are presented in Table 2. The models for both Overall Hospital Rating and Recommend the Hospital were significant ($F(\text{Overall Rating}) = 26.39$, $p < .001$; $F(\text{Recommend the Hospital}) = 24.41$, $p < .001$). Advertising spending was associated with a higher percentage of patients rating the hospital a “9” or “10” and a higher percentage of patients who “definitely” would recommend the hospital. Across the entire dataset, a 1-percent increase in a hospital’s advertising-per-thousand expenditure is associated with a 0.716-percent increase in the proportion of patients rating the hospital a “9” or “10”, and a 1-percent increase in advertising-

Table 2: Regression of HCAHPS Global Ratings on Advertising Expenditures and Hospital Characteristics

	<i>Dependent Variable: Percent Rating Hospital “9” or “10”</i>		<i>Dependent Variable: Percent “Definitely Will Recommend” Hospital</i>	
	<i>Coefficient</i>	<i>p</i>	<i>Coefficient</i>	<i>p</i>
Ln advertising expenditures CPM	.716	.000	.985	.000
Number of beds	−.002	.086	−.002	.084
Teaching hospital	−.698	.060	.078	.851
Profit status				
For-profit	Ref		Ref	
Government	−.953	.108	−.490	.461
Nonprofit	1.888	.000	2.618	.000
Urban–rural	.101	.832	2.683	.000
Region				
West	Ref		Ref	
Northeast	−4.686	.000	−4.988	.000
Midwest	−1.060	.024	−2.732	.000
South	2.080	.000	.455	.419
System-owned hospital:	−1.243	.001	−.981	.023
0 = Independent				
1 = System-owned				
System HHI	.001	.002	.001	.005
Interaction: Ln advertising CPM × System HHI	−.001	.001	−.001	.002

Note. CPM, cost per thousand.

per-thousand is associated with a 0.985-percent increase in the proportion of patients responding that they “definitely” would recommend the hospital.

The model presented in Table 2 contains an interaction variable, the natural log of advertising CPM times the System HHI, as well as those two variables individually. This term was included in the model as an initial attempt to test the hypothesis that the relationship between advertising expenditures and HCAHPS scores would be stronger in more competitive markets. The coefficients for the interaction terms were significant ($p < .001$ for Overall Hospital Rating and $p < .002$ for Recommend the Hospital), as were the coefficients for the individual terms. We further examined this interaction by producing Figure 1, where we divided the hospitals into three HHI categories using the U.S. Department of Justice and the Federal Trade Commission (1992) guidelines for defining market concentration: competitive (HHI below

Figure 1: Advertising Spending and HCAHPS Global Measures, by System Concentration in DMAs [Color figure can be viewed at wileyonlinelibrary.com]

(a) Overall Rating 9 or 10, HCAHPS 2012

(b) Recommend Hospital, HCAHPS 2012

1,000), moderately concentrated (HHI between 1,000 and 1,800), and highly concentrated (HHI above 1,800). We divided the hospitals into quintiles based on CPM.

Figure 1 suggests that the relationship between the two dependent variables and the advertising CPM is very strong for competitive markets (HHI below 1,000) and not as strong for either moderately concentrated or highly concentrated markets. This corroborates the significant interaction terms. To more rigorously test these visual suggestions, we conducted six additional regression analyses, consisting of each of the two dependent variables with all predictor variables except the interaction variable for each of the three HHI categories.

The results are shown in Tables 3 (competitive markets), 4 (moderately concentrated markets), and 5 (highly concentrated markets).

Tables 3, 4, and 5 indicate that the significance of the effect of advertising expenditures on both dependent variables is due to the effect it has on the hospitals operating in competitive markets (HHI below 1,000). When this segment is separated and analyzed independently, the estimated effect on hospitals in these markets is larger than the estimated effect from the overall regressions (1.173- vs. 0.716-percent increase in the proportion of patients

Table 3: Regression of HCAHPS Global Ratings on Advertising Expenditures and Hospital Characteristics: Competitive Markets (HHI below 1,000)

	<i>Dependent Variable: Percent Rating Hospital “9” or “10”</i>		<i>Dependent Variable: Percent “Definitely Will Recommend” Hospital</i>	
	<i>Coefficient</i>	<i>p</i>	<i>Coefficient</i>	<i>p</i>
Ln advertising expenditures CPM	1.173	.000	1.540	.000
Number of beds	.001	.569	.001	.999
Teaching hospital	−1.684	.015	−1.300	.086
Profit status				
For-profit	Ref		Ref	
Government	−2.741	.020	−1.531	.238
Nonprofit	−.294	.734	.770	.417
Urban–rural	−2.958	.013	−.756	.563
Region				
West	Ref		Ref	
Northeast	−3.322	.000	−3.524	.000
Midwest	−1.251	.186	−3.514	.001
South	3.518	.000	.915	.407
System-owned	−1.738	.013	−1.146	.135

Note. CPM, cost per thousand.

Table 4: Regression of HCAHPS Global Ratings on Advertising Expenditures and Hospital Characteristics: Moderately Concentrated Markets (HHI 1,000–1,800)

	<i>Dependent Variable: Percent Rating Hospital “9” or “10”</i>		<i>Dependent Variable: Percent “Definitely Will Recommend” Hospital</i>	
	<i>Coefficient</i>	<i>p</i>	<i>Coefficient</i>	<i>p</i>
Ln advertising expenditures CPM	.026	.849	.273	.080
Number of beds	–.003	.123	–.003	.170
Teaching hospital	–.295	.649	.443	.551
Profit status				
For-profit	Ref		Ref	
Government	.260	.798	.706	.546
Nonprofit	2.533	.001	3.351	.000
Urban–rural	2.096	.013	4.415	.000
Region				
West	Ref		Ref	
Northeast	–5.650	.000	–6.809	.000
Midwest	–.780	.306	–2.288	.009
South	.863	.301	–.273	.776
System-owned	–1.398	.046	–1.045	.195

Note. CPM, cost per thousand.

rating the hospital a “9” or “10” on the HCAHPS survey for a 1-percent increase in advertising-per-thousand, and 1.540- vs. 0.985-percent increase in the proportion of patients responding that they “definitely” would recommend the hospital for a 1-percent increase in advertising-per-thousand), and the effect of advertising expenditures is not statistically significant for either dependent variable in the moderately or highly concentrated markets.

The competitive markets (HHI below 1,000) tend to be large metropolitan areas with many hospitals: the average market size of competitive DMAs was 3.3 million households. By contrast, the average market size of concentrated markets (HHI above 1,800) was 450,000 households. The largest cities have more hospitals, some of which remain independent as they serve a niche, neighborhood, or portion of the DMA where they have a local referral base. In addition, even successful attempts at consolidation in very large markets will reduce the total number of hospitals by a rather small percentage, while in small markets one consolidation among two independent hospitals can significantly reduce competition.

Both HCAHPS scores and advertising spending data were available for 2011 and 2012, so we examined the hypothesis that growth in advertising

Table 5: Regression of HCAHPS Global Ratings on Advertising Expenditures and Hospital Characteristics: Highly Concentrated Markets (HHI above 1,800)

	<i>Dependent Variable: Percent Rating Hospital “9” or “10”</i>		<i>Dependent Variable: Percent “Definitely Will Recommend” Hospital</i>	
	<i>Coefficient</i>	<i>p</i>	<i>Coefficient</i>	<i>p</i>
Ln advertising expenditures CPM	−.064	.677	.164	.342
Number of beds	−.002	.112	−.002	.127
Teaching hospital	.072	.903	1.231	.065
Profit status				
For-profit	Ref		Ref	
Government	−.107	.905	−.254	.801
Nonprofit	3.159	.000	3.492	.000
Urban–rural	.205	.739	2.897	.000
Region				
West	Ref		Ref	
Northeast	−4.651	.000	−5.415	.000
Midwest	−1.587	.033	−2.909	.001
South	1.627	.038	.186	.833
System-owned	−.821	.172	−1.141	.092

Note. CPM, cost per thousand.

spending would be associated with improvements in HCAHPS scores over this time period. We created two longitudinal variables: Change in advertising spending was created by subtracting hospitals’ advertising expenditures in 2011 from 2012; and changes in the two HCAHPS global items (Overall Hospital Rating and Recommend the Hospital) were created by subtracting the 2011 measures from the 2012 measures. We conducted regression analyses with the changes in the global HCAHPS item scores as dependent variables and the natural logarithm of change in advertising spending, hospital characteristics, and system market concentration (HHI) as independent variables. The results showed that change in advertising spending did not predict changes in HCAHPS global measures in the time period studied. These analyses are shown in the online Appendix.

DISCUSSION

We examined the relationship between hospitals’ advertising expenditures and their HCAHPS scores on two global items. We found that advertising

spending was a significant predictor of HCAHPS scores, and this effect was most pronounced in competitive markets where patients had more choices among rival hospitals and systems. In these markets, a 1-percent increase in advertising spending per thousand households in the hospital's DMA was associated with a 1.17-percent increase in the percent of patients rating the hospital a "9" or "10" and a 1.54-percent increase in the percent of patients indicating they would "definitely recommend" the hospital. The results suggest that although the effect is relatively small, in competitive markets, HCAHPS ratings and changes in percentile ranks can be influenced by the amount a hospital decides to spend on advertising. As seen in Figure 1, in competitive markets (HHI below 1,000), hospitals in the highest quintile of advertising spending receive top-box Overall Hospital Ratings from almost 72 percent of patients, compared with 65 percent of patients in the lowest quintile. This finding can be further illustrated by examining differences in percentile ranks between high and low spending hospitals; a hospital with an Overall Hospital Rating of 65 percent corresponds to the 25th percentile of hospitals, while a hospital with an Overall Hospital Rating of 72 percent falls between the median and 75th percentile (HCAHPS Percentiles 2013). On the Willingness to Recommend measure, for hospitals in the highest-advertising quintile, 76 percent of patients say they "Definitely Would Recommend" the hospital, compared to 67 percent for hospitals in the lowest-advertising quintile. In our sample, these ratings correspond to the 72nd percentile and 34th percentile, respectively.

Our findings are consistent with marketing studies in other industries, which have demonstrated links between advertising spending and customer satisfaction ratings. However, our study shows that in the hospital industry, the relationship is most likely to occur in competitive markets. Because value-based purchasing rewards and penalizes hospitals' HCAHPS performance, the results suggest that hospital administrators could potentially earn rewards by increasing their advertising budgets if they operate in more competitive markets. We found no evidence that administrators attempted to influence HCAHPS scores by increasing spending on advertising; however, the fact that it may be possible to do so suggests that policy makers should understand the ways in which HCAHPS measures could be affected by hospitals' marketing actions.

It is tempting to conclude that the relationship appears in competitive markets because advertising is needed only where competition exists, and since hospitals in concentrated markets (HHI above 1,800) spend relatively little on advertising, the effect is attenuated. However, hospitals that operate in

moderately concentrated markets (HHI between 1,000 and 1,800) spend about the same amount on advertising, on average, as hospitals in competitive markets (HHI below 1,000), though with much greater variability than the other two HHI categories. This variability suggests that in moderately concentrated markets, some hospitals may adjust their advertising spending based on market-specific conditions, and their advertising expenditures are not associated with HCAHPS scores. These conditions could include the number and market power of payers, relative size or proximity of their competitors, and the characteristics of their systems or networks. Further research is needed to examine the role of these factors.

Our study also contributes to knowledge of multihospital health systems' market power, which has been growing with the horizontal integration taking place in the industry (Cuellar and Gertler 2003; Moriya, Vogt, and Gaynor 2010). Compared to independent hospitals, multihospital systems can achieve greater marketing efficiency by spreading advertising costs across more hospitals and a market-wide geographic footprint, and consequently, these systems can better leverage their expenditures. Furthermore, multihospital systems can afford more elaborate and expensive advertising campaigns, increasing their market power by enhancing their brand image, both setting the stage for potentially higher HCAHPS scores and positioning themselves to attract commercially insured patients. The rise of multihospital systems also illustrates the importance of measuring advertising expenditures at the DMA (i.e., market) level, rather than the service area of each individual hospital. When a hospital purchases advertising, the price is usually based on the number of households in the DMA regardless of overlap between the service area and the DMA. This provides a scale advantage to multihospital systems because their hospitals' combined service areas are more likely to cover an entire DMA. On one hand, this trend may lead to increased expenditures on advertising as health systems seek to leverage their size and geographic footprint. On the other hand, the market-wide efficiencies of multihospital systems could result in less advertising as systems use their leverage to drive down costs. Further research is needed to explore these effects.

Our findings lend support to the marketing hypothesis that advertising raises expectations of a good experience and patients who previously saw advertising could be more likely to rate the hospital favorably. Thus, our results are consistent with Deighton's (1984) expectations-confirmation theory of advertising. When it is difficult for consumers to judge the objective quality of a product or service based on their experience or evidence, advertising plays an outsized role in their perceptions of and preferences for the brand

(Deighton 1984; Ha and Hoch 1989; Smith 1993), and consumers exposed to higher advertising levels develop expectations of favorable experiences.

Our study has several limitations. First, our hypothesis rests on a marketing theory that has not been formally tested in the health care industry. Additionally, we do not know whether patients actually saw the advertising, just that they had a higher probability of exposure to advertising if the hospital spent more on it. Further research is needed explore the interaction of advertising and hospital patient experience among consumers whose exposure to advertising is controlled experimentally. It will also be important to examine advertising in the context of exposure to patient experience data (HospitalCompare) and other indications of reputation strength, such as inclusion in Top 100 lists (Larson et al. 2005). These sources of information serve as means for prospective patients to judge hospitals' quality before they actually experience the care, just as product quality ratings help consumers to assess goods and services before buying them (Deighton and Schindler 1988). Larson et al. (2005) suggest that the positive expectations aroused by advertising are pronounced for academic medical centers because these institutions command a higher level of trust, especially prestigious academic medical centers that appear in top 100 lists. Thus, advertising may be more credible coming from a well-known medical center whose patients have high expectations when they receive care there, and favorable expectations aroused by advertising may be enhanced by the preexisting reputations of the medical centers.

Our study was limited to the two HCAHPS global measures, which were chosen because they most closely resemble commonly used variables in brand marketing studies across many industries. Other measures of consumer brand preference and customer satisfaction may be more suitable, although HCAHPS is unique because it is administered to samples of patients in nearly all U.S. acute care hospitals. Although HCAHPS is not designed to assess satisfaction but rather patient experiences of hospital care, the survey is often used to measure satisfaction (Zusman 2012; Morris, Jahangir, and Sethi 2013; Keckley 2014) and brand strength (McCaughey et al. 2014). Both patient experience dimensions and global measures are important in VBP calculations. While there are staff education and training programs designed to improve specific patient experience measures (e.g., nurse communication, doctor communication, and discharge instructions), the HCAHPS global items relate to the general strength of the hospital brand and patient perceptions and thus may prove more difficult to improve through training. Administrators in competitive markets may be able to influence global measures with

advertising investments while engaging in educational programs designed to improve performance on specific patient experience dimensions.

This study is also limited in that the main findings are based on cross-sectional data. Available data permitted longitudinal analyses over a 2-year period, but these analyses yielded no significant results. These findings may be partially explained by the fact that neither hospitals' HCAHPS scores nor their advertising expenditures change much from year to year, thus restricting the ability to identify longitudinal relationships. A recent study by Elliott et al. (2015) showed that an HCAHPS composite measure, including Overall Hospital Rating, increased by 2.8 percentage points from 2008 to 2011, and the hospital-level adjusted correlation between 2008 and 2011 HCAHPS scores was .69. Their results suggest that while a few hospitals achieved 10-point improvements, HCAHPS scores did not increase or decrease rapidly. In our data, the correlation in the advertising CPM's for 2011 and 2012 was .90. Even if enough hospitals did make significant changes in advertising expenditures, improving an institution's brand reputation likely requires long-term investments and rapid changes are rarely observed (Lodish and Mela 2007). A larger dataset spanning more years would have better potential to detect longitudinal effects.

Our analysis does not allow conclusions to be drawn about causal relationships between advertising spending and HCAHPS. It is possible that savvy administrators will take advantage of this association to raise their HCAHPS scores by increasing spending on advertising rather than on programs designed to improve patient experience. However, it is also possible that hospitals with favorable HCAHPS scores are likely to advertise due to their institutions' superior performance, to differentiate themselves from the competition and use advertising as a quality signal (Milgrom and Roberts 1986). For example, hospitals earning "Top 100" recognitions often increase their advertising (Rosenthal 2013). Further research is needed to determine the causal direction of the relationships we uncovered.

The main incentive for hospitals to advertise is to attract commercially insured patients, yet advertising's effect on hospitals' HCAHPS scores is an important aspect that has not been studied to date. Both marketing theory and our study's findings suggest that advertising affects brand strength, which can in turn affect HCAHPS, suggesting that administrators and policy makers should become aware of these marketing dynamics. To critics of hospital advertising, our findings may supply another reason to oppose the practice since they imply that a patient experience measure designed to help administrators improve internal hospital operations may be altered by spending more

on consumer advertising. However, from a marketing perspective, the findings imply that advertising creates stronger hospital brands that in turn set patient expectations of a favorable experience, which are then confirmed by experience during their stay. This study illustrates the complex dynamics of patients' perceptions in the competitive hospital marketplace, where people have choices and are expected to choose the best option using what they learn from both advertising and experience.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: This study was funded by a grant from the Union Graduate College Board of Trustees. The authors have no conflicts of interest to report. We thank Amy Nevin, M.B.A., for her assistance with data preparation, programming, and analysis. We thank Diane Mastin, M.S., for her assistance with preparing and editing the manuscript.

Disclosures: None.

Disclaimers: None.

NOTE

1. Some hospitals, especially small independent hospitals, may not use mass media advertising because these expenditures are not cost-effective in a large geographic area (i.e., DMA). Some of these hospitals may have advertised only in their local service areas, or they may have used social media or public relations, which are not measured by Kantar Media.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Table A1. Regression Results: HCAHPS Global Ratings on Advertising Expenditures and Hospital Characteristics, Longitudinal Analysis, 2012 vs. 2011.

Table A2. Hospitals Excluded from the Final Sample.