


Associations Between Nonclinical Services and Patient-Experience Outcomes in US Acute Care Hospitals

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Abstract

Background: Patient experience is an important measure of hospital quality and performance. Since the passage of the Affordable Care Act, patient experiences with their care encounters are embedded into the framework of payment incentives. However, drivers of patient experience in the context of the supportive, nonclinical, services that relate to patient care have not been as well understood. **Aims:** To assess the role of organizational factors on patient experience. **Methods:** This cross-sectional analysis integrates hospital patient-experience scores from Hospital Consumer Assessment of Healthcare Providers and Systems, and Centers for Medicaid and Medicare Service data from 2013 to 2015 (N = 3392). Based on hospitals with “top-box” responses, the aggregate proportion of hospital patients responding “always” on a Likert scale represented a top-box hospital. Domains were split at the mean for analysis (above average = 1). Multivariable logistic regression models for each domain were analyzed against hospital factors and services, including offering a patient education center, patient-enabling services, and language services. **Results:** Most hospitals reported a full-time hospitalist (64.4%) and a patient education center (60.4%), while fewer provided enabling/support services (33.7%). In multivariable models, small and medium hospitals performed better compared to the largest hospitals (300+ beds; $P < .0001$). Structurally, medium and small hospitals reported significantly greater odds of top-box patient-experience versus large hospitals. Across all domains, only hospitals with patient education centers returned better performance (adjusted odds ratio: 1.27-1.64; $P = .0002-.0166$). **Discussion/Conclusion:** Patient education centers provide relevant information at the point of service and may improve overall patient experience of care. Given the growing reliance on accountable care delivery models, opportunities to partner with community health education partners may be profitable.

Keywords

communication, education, HCAHPS, organizational communication, patient education, patient expectations, patient satisfaction

Introduction

Hospitals rely on learning from patient experiences to improve how they deliver care. Their goal is to deliver the best care possible in order to continue attracting patients. To remain competitive, hospitals adopt care reimbursement models designed to incentivize provider performance that results in the best, most efficient, care. Achieving such a balance of high-quality care delivery and outcomes at a low cost is the consistent goal of hospitals (1–3). This end is similar for the health-care system, with the added goal of population health, these efforts represent value, or the “triple-aim” target of high-quality health care, at a lower cost, for all (4).

Hospital measures that identify practices related to high-quality patient outcomes and overall hospital performance through objective clinical data such as time to treatment (5).

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However, hospitals also offer nonclinical services that are utilized by patients, their families, or caregivers and contribute to successful episodes of care through better performance and value (6).

Nonclinical, patient-facing services are used by the patient, their caregiver, or a family member. These include patient education centers, family services, and other supportive services. Although not all services will contribute to adding value, there is evidence to suggest that some of these process-level, nonclinical services align with improved patient-experience outcomes and thus value (6,7). These patient-facing services can be overlooked by the organization solely as integrated parts of operational processes and not as contributors to performance outcomes. Understanding the role of nonclinical, patient-facing resources and their contribution to patient experiences can help hospitals leverage existing resources without increasing costs. The goal of this analysis is to explore the role of nonclinical, patient-facing hospital services on patient-experience outcomes.

In 2013, hospitals were tasked with addressing nonclinical performance (in addition to clinical) with the introduction of the Centers for Medicaid and Medicare Service (CMS) *Hospital Value-Based Purchasing* (VBP) program. The VBP program redefined value, and thus patient care reimbursement, as a function of patient-experience and clinical outcomes (7). Specifically, the VBP was an equation that consisted initially of 2 weighted values: *clinical process of care* (CPC; weight 70%) and *patient experience of care* (PEC; weight 30%). This combined, or *total performance score*, became an indicator for the level of reimbursement the hospital was entitled to receive. The CPC value is derived from select clinical outcomes (7), the PEC value comes from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). The HCAHPS is an ongoing hospital-based survey that asks patients about their interactions within the hospital setting, including their encounters with physicians, nurses, and ancillary hospital staff (8). This comprehensive, validated HCAHPS measure is a composite of 7 summary measures (7). The methodology behind the collection and validation of HCAHPS measures has been described in detail in the literature (5,8). Although the weights of CPC and the PEC values are the subject of ongoing revision, the core components that make up the CPC and the PEC reflect the same content in our analysis (5).

Patient experience remains a complex endeavor to capture and assess with precision (9). At the core of the patient experience is communication with providers, nurses, and hospital personnel (10). Successful communication relates to a patient's social, cognitive, or linguistic information needs. Useful communication results in an improved patient commitment to treatment regimen, increased adherence to medication, and better health outcomes (7,11,12). Patients receiving care assess their experiences through individual factors they value, which may not be equivalent to their actual health outcome. Patients are more likely to assess an experience based on how their interactions succeeded in

meeting desired communication and information needs (9). Structurally, supportive patient-facing services or processes can contribute to successful communication (13). Provider communication involves a high level of emotional capacity that includes compassion, empathy, reliability, and responsiveness in addition to conveying relevant information about a condition (10). The dimension we used in our study that gets at the core of the patient experience is communication with providers.

Providers who effectively communicate appropriate and tailored health information, provide support, and express respect for the patient in the care delivery process are more likely to ensure patients remain updated along all touch points of the care continuum. Conversely, studies show that providers who are ineffective in clearly conveying information pertinent to treatment regimens not only negatively affect patient experience but potentially outcomes as well (11).

Drawing from the seminal framework on quality of care delivery by Donabedian and colleagues, we want to assess how existing hospital-level structural and service factors (process) are associated with patient-experience outcomes (12). This framework emphasizes the role of hospital structure, or where care occurs, as interacting with how care is delivered (processes or services). By exploring organizational factors related to optimal patient experiences, we can leverage or deploy these services for improved performance (12). Hospitals emphasize clinical care and patient safety to ensure the best care and outcomes. We hypothesize nonclinical, patient-facing services can also contribute to this goal (7).

Methods

Data Sources

We conducted a cross-sectional study that integrated secondary data from the 2013 American Hospital Association (AHA) annual survey, the 2014 to 2015 HCAHPS data for patient-experience outcomes, and the 2015 case-mix index (CMI) from CMS to control for patient acuity. The AHA conducts an annual hospital-level survey to provide a comprehensive census of US hospital characteristics and services. Because hospital structures do not change over time, we used the most recent data available at the time of this study. The HCAHPS data set is a standardized assessment of patient perception of hospital care, with surveys aggregated to the hospital-level in public-use files (14). The patient-experience data were aggregated to the hospital level with the following criteria: Adults were age 18 years or older, admitted to US hospitals for at least 1 night for nonpsychiatric inpatient care, and linked to a final data set by each Medicare group number (15).

We included general, acute, nonfederal hospitals as the unit of analysis. Critical access hospitals were excluded per Section 1886, subsection (d)(1)(B) of the Social Security Act that clarifies requirements for participation in the Hospital

Value-Based Purchasing (VBP) Program (16). We also excluded hospitals if they completed fewer than 100 surveys for the reporting period to ensure adequate representation from each hospital. A unique hospital identifier joined data sets for a final analytic sample size of 3392.

Dependent Variable

Outcome. The HCAHPS outcomes accessed from the site were already aggregated into composite measures, with HCAHPS-specific domains reported in Likert scales (eg, *never, sometimes, always*) (15). Although methods for how HCAHPS measures were developed and validated are published elsewhere, the original composite and summary measures comprise *nurse and doctor communication, hospital cleanliness and environment, and overall hospital rating* (7).

Our analysis focused on high or “top-box” performers, with responses limited to patients who reported “always” responses for the selected dimensions. Hospitals focus on this designation for assessing above-average patient-experience outcomes on the HCAHPS (Table 1) (17).

Outcome domains were aggregated and categorized in accordance with HCAHPS naming conventions: 3 summary measures (doctor always communicated well, nurse always communicated well, environment of care), 1 global measure (hospital rating “9” or “10”), and 3 general measures (information about recovery always explained before discharge, patient always received help when desired, staff always explained medication before administering). After diagnostics and sensitivity analysis using univariate and χ^2 analyses, the mean of each domain determined the cut-point (Table 1) for the dichotomous dummy variables (“above average” = 1 or “below average” = 0).

Independent Variables

Structure variables. Hospital ownership, which can be driven by profit or community benefit, can also influence an organization’s mission, vision, strategic direction, and culture (13). In addition, hospital size, measured as the number of beds, influences patient-experience outcomes. Smaller hospitals may have barriers in their abilities to mobilize resources. Similarly, teaching status (operationalized as membership in the Council of Teaching Hospitals) and Joint Commission accreditation are 2 standards that lend legitimacy to a hospital and can contribute to performance of both financial and patient outcomes (18).

Where a hospital is located can affect service provision and function of resources, including staffing and timeliness (19). For this study, hospital location was dichotomized as rural versus urban. Ownership was categorized as not-for-profit (NFP), for-profit (FP), or government/public. Hospital size was divided into discrete intervals of small (<100 beds), medium (100-299), or large (\geq 300 beds).

Table 1. Characteristics of Patient-Experience Outcomes (N = 3392).^{a,b,c}

Proportion (%) of Hospital HCAHPS Participating In-Patients Who Indicated the Provider “Always” on Likert Scale:	N	Mean	SD	Range (Min-Max)
1. Doctor always communicated well (summary measure)	3392	0.79	0.06	0.48-1.00
2. Nurse always communicated well ^a (summary measure)	3392	0.74	0.06	0.38-0.99
3. Global: Hospital rating of 9 or 10 (global measure)	3392	0.64	0.09	0.29-0.97
4. Environment of care (summary measure)	3392	0.62	0.08	0.37-0.91
5. Information about recovery was always explained before discharge	3392	0.80	0.05	0.52-0.97
6. Patient always received help when desired	3392	0.62	0.09	0.30-0.99
7. Staff always explained medication before administering	3392	0.58	0.06	0.28-0.93

Abbreviations: HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; SD, standard deviation; VBP, value-based purchasing.

^aAll measures were reported on a Likert Scale and recoded by HCAHPS for public use.

^bSummary measures: Questions 1 to 3 of the HCAHPS survey are combined to represent doctor communication and questions 4 to 6 are combined to represent nurse communication, the same for environment of care (“HCAHPS Hospital,” 2014-2015).

^cThe measure “pain was always controlled” was replaced with “care transition” measure for FY2018-19 for VBP/HCAHPS and excluded from the present analysis.

Process variables. Information about organizational processes, or hospital services, offered were drawn from the AHA database. Based on our framework, we selected hospital services that are evidence-based, patient-facing services. These include hospital language services, patient education center, patient representatives, enabling services, and pain management services. In 2018, pain management was replaced with a measure of care coordination. The availability of language services varies but is mandated in all federally funded hospitals and is known to improve patient-provider communication for limited English-proficient patients (20). In addition, evidence suggests that offering patient education improves communication by giving patients the opportunity to play a more active role in their care team decisions (21). Patient education centers aim to enhance clinical communication by defining “written goals and objectives for the patient and family related to therapeutic regimens, medical procedures, and self-care” (14). They achieve this through teaching, counseling, behavior modification techniques, and other methods that may contribute to improved patient-experience outcomes (22). Another resource stems from patient’s having access to a patient representative, designated as “personnel through whom patients and staff can seek solutions to institutional problems affecting the

delivery of high-quality care and services” (14). Enabling services are patient-facing services for both patients and their family, including transportation and referrals to local social services agencies, which work to support patients to establish and maintain access to care (19). Finally, we included hospitalists, hospital medicine specialists who facilitate care coordination for admitted patients.

Pain management programs provide specialists and therapies for the management of acute or chronic pain (14). Though pain management was removed from the patient-experience calculation for VBP and replaced with a measure of care transition, we have included pain management programs as an organizational measure.

Independent categorical variables were recoded for analysis. Services were represented as dichotomous variables reflecting whether the hospital offered them (“yes” = 1, “no” = 0). Due to its importance, the hospitalist variable had 3 categories as to whether the hospital employed a hospitalist (“no” = 0, “yes” = 1, and “unknown/no response” = 2) to ensure that nonrespondents were also included in the analysis.

Data Analysis

The distribution of variables of interest and goodness of fit was assessed using a χ^2 approach for categorical variables. Multivariable logistic regression models were fitted to explore the relationship between hospital factors and services on HCAHPS patient experiences. Model fit was assessed using a Wald effects test for each model. Hospital CMI was included in the models to account for patient severity from the Hospital Compare website (23,24). All data management and analyses used SAS version 9.4 software (Cary, North Carolina).

Results

Descriptive Results

Overall, 3392 hospitals were included in the analysis, a majority were NFP (65.4%), medium sized (100-299 beds, 41.0%), and located in urban areas (86.2%). Further, few hospitals were teaching accredited (7.3%), while a majority had system membership (66.7%) and Joint Commission accreditation (77.2%). Within hospital characteristics, we found most organizations employed hospitalists (64.4%), provided language services (75.1%), a patient education center (60.4%), and patient representatives (69.9%). Conversely, only 33.7% reported offering enabling services.

Across HCAHPS patient-experience domains, above-average or top-box patient-experience performance occurred more among small, public, nonfederal (<100 beds), rural, nonteaching, Joint Commission accredited, nonsystem hospitals ($P < .0001$, Table 2). However, language, enabling, patient education center, pain management program, and patient representative all differed significantly across the domains of “global hospital rating 9/10” and “information

about recovery was always explained before discharge” ($P < .0001$ to $P < .05$).

Multivariable Logistic Regression Results

Results for multivariable models fitted for each outcome are given in Table 3 and summarized visually for lower and higher odds of top-box patient-experience outcomes in Figure 1. A receiver operating characteristic (ROC) or predictive curve fitted for each domain of patient experience (ROC range = 0.64-0.76) demonstrated moderate-to-good predictive power for our models.

Structurally, ownership and bed size were the only organizational characteristics associated with better patient experience. Across all domains, small hospitals were most likely to report above-average patient experience, with adjusted odds ratios (AOR) ranging from 3.52 (95% confidence interval [CI], 2.65-4.68, $P < .0001$) to 7.24 (95% CI, 5.31-9.89, $P < .0001$; Table 3). For-profit hospital ownership was associated with lower odds of top-box performance across 6 of 7 domains. Despite these associations, the domain of “patients always received help when desired” was significantly associated with lower odds of top-box patient experience for nearly all organizational structure factors (excluding bed size, and ownership was mixed).

At the organizational process level, patient education centers had the most significant effect on how health care is delivered across all patient-experience domains. Hospitals with a patient education center reported significantly greater odds of above-average patient experience ranging from 27% to 64% compared to hospitals that did not indicate having 1 (AOR: 1.27-1.64, $P < .05$). Hospitals that employed a hospitalist in their organization had lower odds of top-box patient-experience outcomes, though this was only marginally significant for 2 domains (doctor always communicated well, AOR = 0.73; 95% CI, 0.54-1.00; $P = .0494$, and patient always received help when desired, AOR = 0.73; 95% CI, 0.53-0.99; $P = .0438$). All other services were not significant (Table 3).

Discussion

Overall, our analysis demonstrated that fewer organizational structures and nonclinical services were supportive of patient experience of care than we hypothesized (12,25). In our study, smaller hospitals had the strongest positive associations across all domains of patient experience. However, hospital size does not necessarily explain the association with top-box patient-experience outcomes. Hospitals that reported having patient education centers followed with the second strongest positive association across all domains for patient experience. This offers support for the argument that nonreimbursable, patient education services may be a worthy investment, given the potential for return. In contrast, hospitalists, hospital-enabling services, language services, and patient representatives resulted in making patient

Table 2. Characteristics of Hospital Structure and Services by Hospitals With Patient-Experience Outcomes (N = 3392).^a

	N	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)
Structure factors								
Hospital ownership								
Not-for-profit	2211	1005 (45.45) ^b	1286 (58.16) ^b	1208 (54.64) ^b	1009 (45.64) ^b	1254 (56.72) ^b	996 (45.05) ^b	1085 (49.07) ^b
For-profit	633	298 (47.08)	243 (38.39)	209 (33.02)	281 (44.46)	254 (40.13)	208 (32.86)	209 (33.02)
Public, nonfederal	538	359 (66.73)	357 (66.36)	286 (53.16)	346 (64.31)	278 (51.67)	326 (60.59)	330 (61.34)
Hospital bed size								
<100	1245	927 (74.46) ^b	975 (78.31) ^b	778 (62.49)	959 (77.03)	752 (60.40)	942 (75.66)	885 (71.08)
100-299	1392	551 (39.58)	623 (44.76)	573 (41.16)	507 (36.45)	676 (48.56)	451 (32.40)	519 (37.28)
≥300	755	188 (24.90)	292 (38.68)	355 (47.02)	174 (23.05)	362 (47.95)	142 (18.81)	228 (30.20)
Urban location								
No	469	397 (84.65) ^b	389 (82.94) ^b	285 (60.77)	398 (84.86)	254 (54.16)	386 (82.30)	342 (72.92)
Yes	2923	1269 (43.41)	1501 (51.35)	1421 (48.61)	1242 (42.51)	1536 (52.55)	1149 (39.31)	1290 (44.13)
Teaching hospital								
Yes	249	47 (18.88) ^b	99 (39.76) ^b	124 (49.80)	42 (16.87) ^b	134 (53.82)	33 (13.25) ^b	84 (33.73) ^b
No	3143	1619 (51.51)	1791 (56.98)	1582 (50.33)	1598 (50.86)	1656 (52.69)	1502 (47.79)	1548 (49.25)
System membership								
No	1130	659 (58.32) ^b	727 (64.34) ^b	592 (52.39)	634 (56.11)	619 (54.78)	638 (56.46)	643 (56.90)
Yes	2262	1007 (44.52)	1163 (51.41)	1114 (49.25)	1006 (44.49)	1171 (51.77)	897 (39.66)	989 (43.72)
Joint Commission accreditation								
No	775	511 (65.94) ^b	546 (70.45) ^b	442 (57.03) ^b	513 (66.19) ^b	409 (52.77)	512 (66.06) ^b	468 (60.39) ^b
Yes	2617	1155 (44.13)	1344 (51.36)	1264 (48.30)	1127 (43.08)	1381 (52.77)	1023 (39.09)	1164 (44.48)
Process factors								
Hospitalist on service								
No	422	309 (73.22) ^b	319 (75.59) ^b	267 (63.27) ^b	312 (74.11) ^b	238 (56.40) ^b	307 (72.75) ^b	276 (65.40) ^b
Yes	2185	973 (44.53)	1173 (53.68)	1125 (51.49)	970 (44.39)	1218 (55.74)	895 (40.96)	1021 (46.73)
No response/ unknown	785	384 (48.92)	398 (50.70)	314 (40.00)	358 (45.61)	334 (42.55)	333 (42.42)	335 (42.68)
Language services								
No	846	475 (56.15) ^b	484 (57.21)	382 (45.15) ^c	465 (54.96) ^b	382 (45.15) ^b	428 (50.59) ^c	428 (50.59)
Yes	2546	1191 (46.78)	1406 (55.22)	1324 (52.00)	1175 (46.17)	1408 (55.30)	1107 (43.48)	1204 (47.29)
Enabling services								
No	2249	1251 (55.62) ^b	1293 (57.49)	1086 (48.29)	1213 (53.96)	1156 (51.40)	1136 (50.51)	1142 (50.78)
Yes	1143	415 (36.31)	597 (52.23)	620 (54.24)	427 (37.36)	634 (55.47)	399 (34.91)	490 (42.87)
Patient education center								
No	1345	743 (55.24) ^b	771 (57.32)	606 (45.06) ^b	720 (53.57) ^b	643 (47.81) ^b	682 (50.71) ^b	666 (49.52)
Yes	2047	923 (45.09)	1119 (54.67)	1100 (53.74)	920 (44.94)	1147 (56.03)	853 (41.67)	966 (47.19)
Pain management								
No	1222	715 (58.51) ^b	724 (59.25)	572 (46.81)	691 (56.55)	564 (46.15)	641 (52.45)	618 (50.57)
Yes	2170	951 (43.82)	1166 (53.73)	1134 (52.26)	949 (43.75)	1226 (56.50)	894 (41.20)	1014 (46.73)
Patient representative								
No	1021	594 (58.18) ^b	598 (58.57)	476 (46.62) ^c	570 (55.83) ^b	487 (47.70) ^c	544 (53.28) ^b	521 (51.03) ^c
Yes	2371	1072 (45.21)	1292 (54.49)	1230 (51.88)	1070 (45.15)	1303 (54.96)	991 (41.80)	1111 (46.86)

Abbreviation: CMI, case-mix index

^aOnly above the mean (top-box) patient-experience values are presented, below mean, that is, Y = 0, are available upon request.^bP < .0001; CMI not reported as only for the model but available upon request.^cP < .05; CMI not reported as only for the model but available upon request.

experiences of care outcomes poorer, not better. These outcomes suggest additional research is necessary to understand what factors predict patient experiences, including a better understanding of population parameters such as location and context.

Our study had limitations. Because the HCAHPS data are collected and compiled on an ongoing basis, the data to which we were able to access may not be reflective of the current HCAHPS reporting. However as indicated regarding the VBP calculation described earlier and given

the integration of these data with multiple data sets, our findings are nonetheless valuable in helping us explore new questions. Further investigation is warranted in understanding the role of nonclinical services on patient experience. For example, including multiple years of patient experience may help identify trends in hospital-resource allocation and subsequent performance not possible with a cross-sectional approach. Additionally, because we only included acute care, nonspecialty hospitals, we are not able to see the effect of care coordination on specific conditions such as cancer.

Table 3. Multivariable Associations Between Organizational Characteristics and Above-Average Hospital Patient-Experience Performance Outcomes.

	1		2		3		4		5		6		7	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Structure	C	0.74	C	0.702	C	0.666	C	0.743	C	0.637	C	0.758	C	0.7
Hospital ownership	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Not-for-profit	1.10	0.88-1.38	0.43 ^a	0.34-0.54	0.45 ^a	0.35-0.56	1.01	0.81-1.28	0.60 ^a	0.48-0.74	0.58 ^a	0.45-0.74	0.53 ^a	0.42-0.67
For-profit	1.93 ^a	1.50-2.49	1.03	0.81-1.32	1.02	0.81-1.29	1.76 ^a	1.36-2.26	0.88	0.69-1.10	1.34 ^b	1.04-1.73	1.34 ^b	1.05-1.70
Bed size	4.53 ^a	3.35-6.05	4.98 ^a	3.72-6.66	3.55 ^a	2.66-4.74	5.07 ^a	3.76-6.85	3.52 ^a	2.65-4.68	7.24 ^a	5.31-9.89	5.48 ^a	4.08-7.34
<100	1.54 ^b	1.22-1.95	1.43 ^b	1.14-1.78	1.29 ^b	1.03-1.61	1.41 ^b	1.11-1.79	1.64 ^a	1.32-2.05	1.81 ^a	1.40-2.32	1.58 ^b	1.25-1.99
100-299	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
>300	0.30 ^a	0.21-0.44	0.46 ^a	0.33-0.66	0.82	0.60-1.10	0.44 ^a	0.31-0.62	1.12	0.84-1.51	0.45 ^a	0.32-0.63	0.74	0.55-1.01
Urban location	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Yes	0.57 ^b	0.39-0.84	0.83	0.60-1.14	0.67 ^b	0.49-0.93	0.55 ^b	0.38-0.82	0.89	0.65-1.22	0.45 ^b	0.29-0.68	0.99	0.71-1.37
No	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Teaching hospital	0.92	0.76-1.12	0.87	0.72-1.05	1.04	0.87-1.25	0.99	0.82-1.21	0.92	0.77-1.11	0.79 ^b	0.65-0.96	0.85	0.71-1.03
Yes	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
No	0.88	0.71-1.11	0.87	0.70-1.09	0.91	0.74-1.13	0.84	0.67-1.05	1.09	0.89-1.35	0.79 ^b	0.63-0.995	1.00	0.81-1.24
Joint Commission accreditation	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Yes	0.73 ^b	0.54-0.999	0.87	0.64-1.18	0.77	0.58-1.03	0.82	0.60-1.12	1.25	0.95-1.66	0.73 ^b	0.53-0.99	1.02	0.76-1.36
Hospitalist on service	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Yes	0.54 ^b	0.37-0.79	0.77	0.53-1.11	0.64 ^b	0.45-0.91	0.58 ^b	0.40-0.84	0.99	0.71-1.39	0.60 ^b	0.41-0.88	0.75	0.52-1.07
No	1.04	0.78-1.40	1	0.75-1.33	0.89	0.67-1.18	0.93	0.69-1.25	0.99	0.75-1.30	1.07	0.79-1.45	0.77	0.58-1.03
Language services	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Yes	0.78 ^b	0.64-0.96	1.13	0.93-1.38	1.15	0.95-1.40	0.87	0.71-1.07	0.98	0.81-1.19	0.94	0.76-1.17	0.95	0.78-1.16
No	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Enabling services for patients	1.60 ^b	1.26-2.04	1.34 ^b	1.06-1.70	1.59 ^a	1.26-2.00	1.64 ^a	1.29-2.10	1.27 ^b	1.01-1.58	1.51 ^b	1.18-1.94	1.51 ^b	1.19-1.91
Patient education center	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Yes	0.79 ^b	0.63-0.99	0.87	0.69-1.09	0.98	0.79-1.22	0.77 ^b	0.61-0.97	1.36 ^b	1.10-1.68	0.90	0.71-1.13	1.09	0.87-1.36
No	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Pain management program	0.83	0.63-1.09	0.97	0.74-1.27	0.93	0.72-1.20	0.96	0.73-1.26	0.97	0.75-1.24	0.80	0.60-1.05	0.93	0.71-1.22
Patient representative	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Yes	0.77	0.49-1.21	1.23	0.80-1.89	7.02 ^a	4.50-10.96	0.61 ^b	0.39-0.97	3.59 ^a	2.34-5.53	1.14	0.72-1.82	1.12	0.72-1.72
No	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—	Ref	—
Case-mix index (range 0.39-2.88)	Mean: 1.35; SD: 0.26													

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; SD, standard deviation.

^ap < .0001.

^bp < .05.

	Patient Experience Performance Outcomes						
Green: Increases odds of outcome (Facilitator) Pink: Decreases odds of outcome (Barrier) Grey: Mixed or not significant	1	2	3	4	5	6	7
STRUCTURE							
Ownership – Ref: Not-for-Profit						**	**
Bed size – Ref: 300+ Beds	Green	Green	Green	Green	Green	Green	Green
Urban Hospital	Pink	Pink	Grey	Pink	Grey	Pink	Grey
Teaching Hospital	Pink	Grey	Pink	Pink	Grey	Pink	Grey
System Membership	Grey	Grey	Grey	Grey	Grey	Pink	Grey
Joint Commission	Grey	Grey	Grey	Grey	Grey	Pink	Grey
PROCESS							
Hospitalist Employed – Ref: No Hospitalist	Pink	Grey	Grey	Grey	Grey	Pink	Grey
Language Services	Grey	Grey	Grey	Grey	Grey	Grey	Grey
Enabling Services	Pink	Grey	Grey	Grey	Grey	Grey	Grey
Patient Education Center	Green	Green	Green	Green	Green	Green	Green
Pain Management Program	Pink	Grey	Grey	Pink	Green	Grey	Grey
Patient Representative	Grey	Grey	Grey	Grey	Grey	Grey	Grey
Case Mix Index – Per Unit	Grey	Grey	Green	Pink	Green	Grey	Grey

* Detailed results are in Tables 3
**Both categories are significant: positive for public hospitals and negative for-profit hospitals; all other green shaded categories are mixed in that only one category is significant. A case-mix index greater than 1 indicates a lower cost patient (CMS, 2015).

Figure 1. Odds of hospitals reporting above-average patient-experience outcomes based on select organizational factors and hospital services.*

Patient education center details, including who delivered and received education (ie, health educator, caregiver, etc), and how instruction was given (in a patient’s preferred language, mobile, brochures, etc) would also be of interest for future analysis. Furthermore, the data did not allow us to address health literacy, another valuable health education parameter. Additional research can also contribute to our knowledge concerning the intersection between these services and additional organizational contextual factors (eg, ownership, technology, and participation in Accountable Care Organization reimbursement models) and population factors (eg, primary language, proportion of uninsured in the population for hospital-enabling services). Our study results suggest that significant opportunities exist for doctors, nurses, hospital stakeholders, and managers to improve outcomes through service alignment. These findings also suggest that patients want to understand their care and be informed consumers. Although our cross-sectional study design warrants further investigation of alternative delivery structures, hospitals that consider the value of services like patient education centers appear to be poised to contribute positively to the patient experience.

Conclusion

The pace at which the health-care system is changing continues to accelerate. Given the amount of information readily available to consumers, the movement toward value-based care and public reporting has the potential to improve patient experience and support hospital performance. As US health-care system reforms continues, it is essential for hospitals to

consider the interdependence of how care is delivered within the context of communication, patient experience, community engagement, and, ultimately, decision-making. Our study contributes to this end by investigating hospital processes and adding to the identification of potential pressure points along the service continuum. Examination of patient perceptions is no longer complete without taking into account organizational factors. Similarly, hospital stakeholders should not miss this opportunity to prepare for and adapt to the impending changes to a more patient-centered system.

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