

THE ECONOMIC IMPACT OF HOSPITAL CONSUMER ASSESSMENT OF
HEALTHCARE PROVIDERS AND SYSTEMS (HCAHPS) SCORES FOR HOSPITALS
PROVIDING INPATIENT PSYCHIATRIC SERVICES

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Abstract

Background – Psychiatric inpatient services generally generate losses for the hospitals that offer them. Due to quality based purchasing programs implemented through the Patient Protection and Affordable Care Act (PPACA), hospital reimbursements are based in part on scores from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey.

Objective – This study examines the relationship between the presence of psychiatric inpatient services and hospital performance on the HCAHPS Survey. If a negative relationship exists, the new quality based purchasing program will amplify hospital losses on this service line and lead to a continued reductions in the number of psychiatric care beds at acute care hospitals.

Method – Five statistical tests are used to evaluate the relationship between inpatient psychiatric services and hospital performance on the HCAHPS Survey and subsequent reimbursement.

Results – Independent t-test results indicate that the presence of inpatient psychiatric services results in lower mean scores on key HCAHPS Survey questions. Spearman's correlation tests indicate that the number of inpatient psychiatric beds has a negative relationship with mean scores on key HCAHPS Survey questions. Finally, a Chi-square test found a negative relationship between the presence of inpatient psychiatric services and the amount of reimbursement received by hospitals from the Centers for Medicare and Medicaid Services (CMS). The result of each test is statistically significant at the 99% level.

Conclusions – This study concludes that the presence of psychiatric inpatient services is correlated with lower HCAHPS scores and reimbursement through CMS. The government should consider an HCAHPS adjustment factor for hospitals providing inpatient psychiatric services in order to create incentives for hospitals to continue providing psychiatric inpatient services.

1 Introduction

As a result of the Patient Protection and Affordable Care Act of 2010 (PPACA), the Centers for Medicare and Medicaid Services (CMS) implemented a change in reimbursement methodology from volume-only reimbursement to a system of reimbursement based on quality and value known as Value Based Purchasing (VBP) [11, 19, 36]. Implemented in Federal Fiscal Year (FFY) 2013, this budget neutral reimbursement system required a percentage of reimbursements to be withheld from each hospital. For FFY 2013, CMS withheld 1% of reimbursements, or approximately \$850 million. These funds were redistributed to the upper 50 percent of hospitals ranked on a weighted average of patient satisfaction and quality of care [30]. Patient satisfaction had a 30% weight based on scores from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, and quality of care had a 70% weight based on the clinical processes of care known as “core measures.”

The HCAHPS survey is the first standardized, extensive, national survey of patient perception of hospital inpatient experiences. HCAHPS scores are routinely described as patient satisfaction scores in the literature [28, 33, 39]. CMS administers the survey and reports the results publicly on its website [8, 14, 30]. The survey is offered to patients meeting certain eligibility requirements, excluding among others any patient with a primary psychiatric diagnosis.¹ Even though psychiatric patients do not participate in the HCAHPS patient experience survey [14], their aggressive and frightening behavior may influence the perception of other patients participating in the survey [31].

The co-habitation of psychiatric and non-psychiatric patients has become an increasing problem as general acute care hospitals close psychiatric units due to financial constraints [3, 4, 6, 16, 26, 29]. In 2006, 27% of general acute care hospitals had inpatient psychiatric units, down from 36% in 2002 [25]. Many times mental health patients are considered charity care in acute care hospitals. Hospital reimbursements and operating margins are worse for hospitals with psychiatric services compared to those without [22]. Acute care hospitals remain in financial jeopardy of closing if their psychiatric inpatient units remain open [22]. As state and county mental health facilities close, the burden is left to general acute care hospitals to care for more and sicker psychiatric patients in fewer beds [17, 20]. It was estimated that in 2010 the US had 28% of the needed inpatient psychiatric beds [24, 32, 37].

The decline of psychiatric beds in acute care hospitals has led to a mental health crisis and burdened emergency departments (EDs). Because fewer beds are available to place psychiatric patients, EDs and general hospital floors are left as the holding sites for psychiatric patients awaiting transfer to psychiatric units [32]. These patients have severe psychotic illnesses and mood disorders [25]. The transfer of psychiatric patients to an appropriate level of care could take days and leads to ED boarding [27]. At times, psychiatric patients in the ED are so disruptive they are restrained or have sitters at their side [10, 20]. As an alternative, some

¹ Patients were excluded from the survey if they did not have an overnight stay, were not classified as inpatient, were younger than 18 years old, were not discharged home, died, or had primary diagnoses related to psychiatric illness or substance abuse. Patients with secondary psychiatric diagnoses were included in the survey [14].

psychiatric patients receive care on non-psychiatric general floors until beds open on the inpatient psychiatric units [22, 23, 32]. Patients transferred to non-psychiatric units usually have less severe diagnoses including anxiety [25].

While on the medical unit nurses capable of caring for the patient's medical condition are ill equipped to care for their psychiatric needs and escalating behaviors [12]. The hospitalized psychiatric patient has been characterized as suicidal, aggressive, paranoid, manic, schizophrenic, or depressed [5, 18, 34, 38]. Psychiatric patients could have acute psychotic episodes, wander into other patient's rooms, and potentially become violent toward themselves, staff and other patients [12].

Psychiatric patients in the hospital setting may influence non-psychiatric patients' perception of overall experience and their likelihood to recommend the hospital. Not all hospitals provide psychiatric inpatient services, but those that do usually incur financial losses [2]. Coupling the financial losses of the service line with potentially lower scores on the HCAHPS survey could be a double financial penalty for acute care hospitals in the CMS VBP program.

Though the PPACA includes provisions designed to close the gap in reimbursement for mental health inpatient treatment [35], a financial disincentive may remain if the presence of inpatient psychiatric units has an adverse effect on hospital HCAHPS scores. As the CMS withhold is scheduled to increase in subsequent years, the financial disincentive will grow. The purpose of this study is to determine if the presence of a psychiatric inpatient unit at a general acute care hospital leads to a statistically significant reduction in HCAHPS scores.

2 Methodology

2.1 Data

Data for this study were gathered from two publicly available sources, the American Hospital Association (AHA) 2011 Annual Survey (AHA) and the CMS website. CMS provided the HCAHPS scores and reimbursement withhold dollars returned to hospitals for the period July 2011 through March 2012. The AHA 2011 Annual Survey was used to gather data on the presence of acute inpatient psychiatric services and the number of inpatient psychiatric beds.

The study sample consisted of every acute care hospital that participated in both the AHA 2011 Annual Survey and the HCAHPS survey from July 2011 through March 2012. Cases with missing variables were excluded from the study. This yielded a sample size of 3,492 acute care hospitals. The HCAHPS survey applied to acute care hospitals including academic and community hospitals, but excluded federal government hospitals, non-federal psychiatric hospitals, long term acute care hospitals, children's hospitals, cancer hospitals, and hospital units within institutions such as prisons.² The HCAHPS data were excluded for hospitals that did not have enough patients to ensure reliability of the hospital level data, and excluded hospitals with

² The HCAHPS survey data also contained patient mix adjustment factors. The factors controlled for participant variables including: 1) Education level; 2) Self-rated health; 3) ED admission; 4) English as a second language; 5) Service lines including maternity; 6) Surgical and medical; 6) Age; and 7) Mode of survey completion including telephonic versus written responses.

quality deficiencies as determined by the Secretary of Health and Human Services [8]. Maryland hospitals are not represented in the HCAHPS survey since this state’s unique payment arrangement exempted it from HCAHPS pay-for-performance [30].

Table 1 Labels, Variable List, and Coding of Variables

Variable	Source	Description
Overall rating of hospital	HCAHPS	Percentage of patients rating hospital as 9 or 10 on a 0 to 10 scale
Likelihood to recommend	HCAHPS	Percentage of patients responding “Definitely Yes”
CMS Withhold Return	CMS	0 = Received penalty 1 = Received withhold 2 = Received bonus
Inpatient psychiatric services	AHA	0 = No 1 = Yes
Number of psychiatric beds	AHA	Total number of inpatient beds

Data collected was used to produce the list of variables described in Table 1. Dependent variables include two measures of patient satisfaction captured on the HCAHPS survey, as well as the amount of CMS withhold returned to the hospital. “Overall rating of hospital” was based on patient responses to question 21 on the HCAHPS survey that read: “Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?” The value presented for each hospital is the percentage of patients responding with either a 9 or 10.

The “Likelihood to recommend” was generated using patient responses to question 22 on the HCAHPS survey that read: “Would you recommend this hospital to your friends and family?” Included are four ways the patient could have answered: 1) Definitely no; 2) Probably no; 3) Probably yes; 4) Definitely yes. The value presented for each hospital is the percentage of patients responding “Definitely Yes.”

“CMS withhold return” is a categorical variable based on results from the VBP model for FFY 2013. CMS withheld 1% of reimbursement for each hospital that year pending the results of a quality assessment. This assessment was based on a weighted average of hospital performance

on “core measures” and patient satisfaction, as measured by the HCAHPS survey. If a hospital received less than the amount withheld, “CMS withhold return” was coded a 0. If the hospital received the exact amount of its withhold or more, it was coded a 1 or 2, respectively.

The variables relating to psychiatric services were created using data from the AHA 2011 Annual Survey. “Inpatient psychiatric services” is a categorical variable that is equal to 1 when these services are present and 0 when absent. “Number of psychiatric beds” is the total number of inpatient psychiatric beds reported by the hospital.

2.2 Research Design

Five statistical models are used to examine the relationship between psychiatric inpatient units at acute care hospitals and the impact that these units may have on patient satisfaction and reimbursement through the VBP program. These models are summarized in Table 2.

Table 2 Summary of Statistical Tests Performed

Model	Dependent Variable	Independent Variable	Statistical Test
1a	Overall rating of hospital	Inpatient psychiatric services	Independent t-test
1b		Number of psychiatric beds	Spearman’s correlation
2a	Likelihood to recommend	Inpatient psychiatric services	Independent t-test
2b		Number of psychiatric beds	Spearman’s correlation
3	CMS withhold return	Inpatient psychiatric services	Chi-square

The first four models examine the relationship between inpatient psychiatric services and the impact these services have on patient satisfaction. Model 1a tests whether the mean for “Overall rating of hospital” is statistically different for hospitals with inpatient psychiatric services and those without. An independent *t*-test is used to determine if there is a statistically significant difference in means between the two groups. Model 1b uses Spearman’s rank-order correlation to test for a relationship between “Number of psychiatric beds” and “Overall rating of hospital.”

For robustness, models 2a and 2b repeat the preceding tests using an alternative dependent variable. Model 2a tests for mean differences in “Likelihood to recommend” between hospitals with and without inpatient psychiatric units. Model 2b estimates the correlation between “Likelihood to recommend” and the number of inpatient psychiatric beds at the hospital.

Finally, Model 3 compares the “CMS withhold return” for hospitals with inpatient psychiatric services and those without. A chi-square statistical analysis is performed to determine if the two variables are statistically independent of each other.

Because multiple statistical tests were conducted, there was an increased probability to experience a type I error and reject a null hypothesis that is true. According to Field [13], the Bonferroni correction addresses this issue by dividing the α -level by the number of tests performed. Employing the Bonferroni correction, the α -level for the study is set to 0.05 with a Bonferroni-adjusted α -level of 0.01 for each of the five individual statistical models.

2.3 Limitations

This study was a non-experimental, observational research design and causation is not assigned to the results. The study sample was constructed based on available data from AHA and CMS. Due to the nature of these datasets, there are several limitations that should be considered when evaluating the results that follow.

The first is that the AHA 2011 Annual Survey was self-reported information and may not be totally accurate. Additionally, not all hospitals participated in this survey and those that did not were excluded from the study. Selection bias may be a concern since hospitals that did not participate in the AHA 2011 Annual Survey may be somehow different from those that did.

The HCAHPS Survey also excluded certain hospitals. Hospitals were excluded if they were located in Maryland, did not have a sufficient number of patient responses to ensure data reliability at the hospital level, or had past reporting discrepancies. Selection bias may be a concern as well if the hospitals that were excluded from the HCAHPS Survey are statistically different from those that were able to participate. Also, the data from the HCAHPS Survey are means reported by month and as such the variance represents the mean scores instead of the variance of the primary scores.

Finally, the CMS withhold return was determined using a weighted quality score. For the time period of this study, 30% of the quality score was based on HCAHPS scores and 70% was based on performance on core measures. A hospital could perform well in core measures and not in HCAHPS and have still received a CMS withhold return bonus.

3 Results and Analysis

Data analysis and tests were run using the Statistical Package for the Social Sciences (SPSS). Sample characteristics are reported in Table 3. Frequencies and percentages are reported for categorical variables. Means, standard deviations (SDs), minimums and maximums are reported for continuous variables.

Table 3 Sample Characteristics

Variable	N	Percent	Mean	SD	Minimum	Maximum
Inpatient psychiatric services						
No	2366	67.8				
Yes	1126	32.2				
CMS withhold return						
0 = Received Penalty	2090	59.9				
1 = Received Withhold	145	4.1				
2 = Received Bonus	816	23.4				
Missing	441	12.6				
Overall rating of hospital			0.694	0.088	0.130	1.000
Likelihood to recommend			0.705	0.099	0.100	1.000
Number of psychiatric beds			10.59	23.242	0	357

The independent t-tests used to evaluate Models 1a and 2a assume homogeneous variance among subgroups within the population. Levene’s Test in SPSS was used to confirm that this assumption was violated for the “Inpatient psychiatric services” subgroups within “Overall rating of hospital” ($F = 46.854, p = 0.000$) and “Likelihood to recommend” ($F = 27.524, p = 0.000$). Therefore a modified version of the independent t-tests was used to allow for heterogeneous variances.

The statistics presented in Table 4 are part of the independent t-tests used to determine whether HCAHPS scores are statistically related to inpatient psychiatric services. The results indicate that hospitals without inpatient psychiatric services had mean “Overall rating of hospital” HCAHPS scores higher (0.703 ± 0.092) than hospitals with inpatient psychiatric services (0.675 ± 0.074). This result is confirmed in the test results for “Likelihood to recommend” that are reported in Table 4. The latter indicate that hospitals with inpatient psychiatric services score lower (0.693 ± 0.088) on the HCAHPS survey than hospitals without psychiatric inpatient services (0.711 ± 0.103).

Table 4 HCAHPS Scores by Presence of Psychiatric Inpatient Services

	w/o Psychiatric services			inpatientw/ Psychiatric services		
	N	Mean	SD	N	Mean	SD
Overall rating of hospital	2366	0.703	0.092	1126	0.675	0.074
Likelihood to recommend	2366	0.711	0.103	1126	0.693	0.088

Results from the independent t-tests presented in Table 5 show the mean difference in “Overall rating of hospital” as -0.027 . The results find that hospitals without inpatient psychiatric services have “Overall rating of hospital” scores 0.027 , 95% CI $[-.033$ to $-.022]$ higher than hospitals with inpatient psychiatric services. The p-value is less than the level of significance for individual tests of $\alpha = 0.01$, indicating that there is a statistically significant difference in the mean “Overall rating of hospital” scores between hospitals with inpatient psychiatric services and those without inpatient psychiatric services.

Also presented in Table 5 are the results for the independent t-test on “Likelihood to recommend.” Hospitals without inpatient psychiatric services had “Likelihood to recommend” scores 0.018 , 95% CI $[-0.023$ to $-0.011]$ higher than hospitals with inpatient psychiatric services. The p-value (>0.001) was less than the stated α (0.01), indicating a statistically significant reduction in “Likelihood to recommend” for hospitals with inpatient psychiatric services.

Table 5 Independent Samples t-Test for Equality of Means

	t-Stat	DoF	p-value	Difference		
				Mean	SE	95% CI
Overall rating of hospital	-9.429*	2704	0.000	-0.027	0.003	-0.033 -0.022
Likelihood to recommend	-5.243*	2542	0.000	-0.177	0.003	-0.024 -0.011

* Mean difference is significant at the 0.01 level (2-tailed).

Results for models 1b and 2b are presented in Table 6. The values reported are for Spearman’s Rho and the corresponding p-values.³ The relationship between “Overall rating of hospital” and the “Number of inpatient psychiatric beds” was negative and weak, $r = -0.154$. The p-value (<0.001) was less than the stated α (0.01), meaning that there is a statistically significant, negative relationship between the number of psychiatric inpatient beds and the “Overall rating of hospital” HCAHPS score. The negative relationship between HCAHPS scores and the number of inpatient psychiatric beds is supported by examining Spearman’s Rho for “Likelihood to recommend.” The relationship between the two variables was negative and weak, $r = -0.073$. The p-value (<0.001) was again less than the stated α (0.01) indicating that the correlation coefficient was statistically different from zero.

Table 6 Spearman’s rho for HCAHPS Scores and Number of psychiatric beds

Independent Variable	Dependent Variable	Spearman’s Rho	p-value
Number of inpatient psychiatric beds	Overall rating of hospital	-.154*	0.000
	Likelihood to recommend	-.073*	0.000

* Correlation is significant at the 0.01 level (2-tailed).

The Chi-square test of independence was used to evaluate the association between the CMS withhold return and the presence of inpatient psychiatric services. The results reported in Table 7 show a statistically significant association between CMS withhold return and inpatient psychiatric services, $\chi^2 = 61.831$, $p < .001$. Table 7 also presents the values for the Phi and Cramer’s V strength of association tests. The results indicate a weak association between CMS withhold and inpatient psychiatric services, $\phi = 0.142$, $p < .001$.

Table 7 Chi-square Tests of Association

	Value	df	p-value
Pearson Chi-Square**	61.831*	2	.000
Likelihood Ratio	64.140*	2	.000
Linear-by-Linear Association	52.705*	1	.000
Phi	.142		.000
Cramer's V	.142		.000
N of Valid Cases	3052		

* Chi square is significant at the 0.01 level (2-tailed).

** 0 cells (.0%) have expected count less than 5. The minimum expected count is 51.17.

The first four models presented in this study found a statistically significant, negative relationship between the presence and extent of inpatient psychiatric services and hospital performance on the HCAHPS survey. The fifth model found a statistically significant, negative relationship between the presence of inpatient psychiatric services and CMS withhold return. When considered together, the results of these five models suggest that the presence of psychiatric inpatient services is correlated with reduced scores on the HCAHPS survey and lower hospital reimbursement through the CMS VBP program.

³ Spearman’s correlation was selected over Pearson’s correlation due to the nonlinearity of the data (Field, 2009).

4 Discussion

Healthcare reimbursement is in the process of shifting focus from a model that focuses on quantity to one that emphasizes quality. The implementation of a VBP program by CMS marked a turning point in this process. During FFY 2013, 1% of hospital reimbursement was tied to hospital VBP scores based on core measures and responses to the HCAHPS survey. The amount of money at risk from the CMS VBP program for hospitals is expected to grow substantially in subsequent fiscal years.

This study utilized data from hospitals with both CMS HCAHPS survey responses and participation in the AHA Annual Survey for 2011. The sample included 3,492 hospitals. This study concluded that relationships do exist between acute care hospitals providing inpatient psychiatric services and two of the hospital's patient experience scores on the HCAHPS survey. Even though psychiatric patients do not complete the HCAHPS survey, hospitals with psychiatric inpatient services showed statistically significantly lower scores on the two HCAHPS questions, "Overall hospital rating" and "Likelihood to recommend." The study also found a statistically significant negative relationship between the number of inpatient psychiatric beds and scores on the two HCAHPS patient experience questions. Using the Chi-Square Test, it also found differences in the observed and expected amounts of CMS withhold return for hospitals with and without inpatient psychiatric services.

During the design phase of the HCAHPS survey hospitals differed from one another and some of these differences explained the variations in HCAHPS scores among acute care hospitals. CMS adjusted for these differences after scientific studies revealed variances due to characteristics of patients rather than differences in quality [7]. Even though patients with primary psychiatric diagnosis, including those on acute care psychiatric units, received no survey [8], this study showed a relationship existed between the presence of the psychiatric patients and low perception scores among non-psychiatric patients on two HCAHPS patient experience questions. Hospitals with psychiatric inpatient units may be at a disadvantage with respect to their HCAHPS patient experience scores when compared to hospitals without inpatient psychiatric units.

Many hospitals providing psychiatric services already do so at a financial loss. This study showed a statistically significant relationship between psychiatric services and lower HCAHPS scores. The relationship may mean that hospitals providing psychiatric inpatient services get a double penalty; losing money because they provided psychiatric services, and losing money due to statistically significant lower HCAHPS scores leading to financial withhold penalties.

CMS should conduct additional research, and if this relationship is verified, it should review the CMS withhold criteria related to hospitals with inpatient psychiatric services. Specifically, modifications may need to be made to the CMS payment mix adjustment factor for the HCAHPS survey. The Centers for Medicare and Medicaid Services adjusts the HCAHPS survey data with a patient mix adjustment factor for participant variables including: 1) education level; 2) self-rated health; 3) ED admission; 4) English as a second language; 5) certain service lines including maternity, surgical and medical; 6) patient age; and 7) mode of survey

completion including telephonic versus written responses. This research suggests an adjustment for the presence or absence of inpatient psychiatric services should be included in the patient mix adjustment calculations. Hospitals with inpatient psychiatric services should not be penalized for providing this already fiscally and clinically challenging service line.

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