Patient hospital experience improved modestly, but no evidence Medicare incentives promoted meaningful gains

Changes in Patient Experience in US Hospitals And the Impact of Value-Based Purchasing

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Abstract

Improving patients' experience with their care is a major policy priority. The Centers for Medicare and Medicaid Services have been leading this effort, most recently by tying hospital payments to patient experience measures under the Hospital Value-Based Purchasing (VBP) program. Despite the substantial attention paid to patient experience, we know little about how much experience has changed over the past decade and even less about the impact of introducing payments tied to performance. Using Hospital Consumer Assessment of Healthcare Providers and Systems survey data from 2008 to 2014, we examine trends in patient experience across U.S. hospitals, and compared these to hospitals not participating in the VBP program. We find national performance on patient experience scores is improving slowly and no evidence that the VBP program has had any beneficial effect. While certain subsets of hospitals improved more than others, the majority of improvement was concentrated in the pre-VBP period.

Introduction:

Over the past decade, policymakers have made measuring, and ultimately, improving patient experience with care a high priority.(1, 2) Patients inherently value provider attributes such as interpersonal skills, effective communication, and responsiveness of clinical staff to their needs.(3) While focusing on patient experience has been controversial, the bulk of the evidence suggests that high performance on these measures is associated with high performance in other areas of quality such as clinical processes, patient adherence and even health outcomes.(4-10) Consequently, patient's perceptions of their health care experiences are increasingly being included as a measure of provider performance in public reporting and pay-for-performance programs.(7)

As of 2008, the Centers for Medicare and Medicaid Services (CMS) began publicly reporting hospital performance on patient-reported experience through the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey. In 2011, CMS increased the emphasis on patient experience by tying Medicare payments directly to these measures through the Hospital Value-Based Purchasing (VBP) program. Hospitals are rewarded either for a high rank or improvement on a number of patient experience metrics, with

an additional incentive to keep all metrics consistently above the median. As such, health care organizations have been investing in strategies and interventions to improve patient experience.(11-13) Since 2015, performance on patient experience scores account for 25% of the VBP program's Total Performance Score, which currently affects 1.75% of CMS payments to hospitals. Despite this substantial attention, we know surprisingly little about the impact of these national efforts on patient experience.(14-16) This is particularly salient as new versions of CAHPS surveys are being rolled out in other care settings, including home health, dialysis centers, hospice, and outpatient/ambulatory settings.(17)

Therefore, in this study using national HCAHPS scores from 2008 to 2014, we sought to answer three key questions. First, has patient experience improved over time and if yes, by how much? Second, did the introduction of the VBP have a measurable effect on patient experience? And finally, did certain types of hospitals (e.g. poor performers at baseline or major teaching hospitals) see greater improvements than other types of institutions under VBP?

Data

Our hospital sample was constructed from the publicly reported HCAHPS data available through CMS.(18) CMS updates the publicly reported data each quarter, to reflect a sample of patients discharged in four preceding consecutive quarters. We extracted all data from the October reporting periods, to reflect a sample of patients discharged between January to December in any given year. Our final dataset consists of hospital level data capturing the experiences of patients discharged between January 2008 to December 2014. To account for any potential bias related to differential characteristics of new entrants reported elsewhere (11), we limited the sample to include only providers who submitted data throughout the entire study period. We also ran analyses where we included those new entrants and adjusted for differences in hospital characteristics including ownership, size, teaching status, hospital size, region, rural-urban location, and whether the hospital has a medical intensive care unit (MICU).

The HCAHPS survey consists of 27 questions regarding patient's experiences, which is administered by hospitals to a random sample of adult patients 48-hours to 6-weeks after discharge. Of these questions, CMS publicly reports individual hospital performance on ten areas: 2 global

measures of patient experience and six composite measures on clinical domains and two individual items on the hospital environment. The six composite measures cover the areas of: (1) communication with doctors, (2) communication with nurses, (3) responsiveness of staff, (4) pain management, (5) communication about medicines and (6) the presence of discharge planning. The two individual questions focus on the (7) cleanliness and (8) quietness of the hospital environment. The two global items represent an overall assessment and include an overall rating on a scale of 0 to 10 and an assessment of whether the patient would recommend the hospital to their family and friends. The publicly reported HCAHPS survey results are adjusted for mode of data collection and patient-mix (including age, education, mode of admission, service line and primary language) as described elsewhere.(19, 20) Of these ten measures, all but patient's willingness to recommend are incentivized in the hospital VBP program.

We used the American Hospital Association (AHA) annual survey to obtain data on the hospital characteristics detailed above, as well as other characteristics that my influence patient experience such as nurse staffing levels, the percent of Medicaid patients at the hospital, the disproportionate

share index. We then constructed a treatment group of acute care hospitals that participated in the VBP program and used hospitals in Maryland and critical access hospitals (CAHs), who are excluded from participation in the VBP program, as a comparison group (non-VBP hospitals).

Outcomes

Our primary outcomes of interest are the two global hospital ratings, overall experience and willingness to recommend the hospital. We include both global outcomes in the analysis as we are interested in examining whether the trends of the incentivized measure (overall experience) and the non-incentivized measure (willingness to recommend) differ. As secondary outcome measures, we also examined the eight other composite or individual measures of hospital experience that are publicly reported by CMS. Our outcome variables are constructed using the CMS method where they represent the proportion of patients reporting the most positive, or "top box" response.(15) For the global ratings our outcomes represent the percentage of patients awarding a '9' or '10' (out of 10) overall hospital rating, and the percentage of patients who would "definitely" recommend the hospital. The top-box response is "Always" for five of the composite measures (communication with nurses, communication with

doctors, responsiveness of hospital staff, pain management, and communication about medicines) and two individual items (cleanliness of hospital environment and quietness of hospital environment). The top box responses for the care transition and discharge information composites are "strongly agree" and "yes" respectively.

Analysis

We first plotted the trend in patient experience measures over time. Next, we ran a segmented linear regression model, using percentage of patients reporting an overall score of 9 or 10 as the dependent variable. A random effect for hospitals was used to adjust for correlation over time, and standard errors were clustered at the hospital level. We controlled for hospital characteristics, and examined the difference in slopes across the pre-and post-intervention periods. We allowed for a change in slope but not in intercept since we did not expect an abrupt change in patient experience at the time of the implementation of the policy, and instead a gradual effect over time. In order to examine whether improvements were more pronounced for different subsets of hospitals we used the same model as above with the addition of an interaction term between time each of the hospital characteristics, namely hospital size, teaching

status, ownership, region, urban/rural location and presence of a MICU. By formally testing the interaction between post-intervention time and type of hospital using a Wald test, we examined if the introduction of the VBP program was associated with a change in the rate of improvement of the patient experience over time.

Finally, we investigated whether the trend in patient experience differed between VBP and non-VBP hospitals before and after the VBP policy was introduced, using a difference-in-trends approach. Because our outcome is available at the hospital level, we used a random-effects segmented regression analysis to examine the change in patient experience after the introduction of VBP, allowing for different slopes in the pre- and post-intervention period, and between VBP hospitals and non-VBP hospitals. We adjusted for hospital characteristics including region, profit status, hospital size, teaching status, urban/rural location, presence of MICU, and clustered standard errors at the hospital level. In addition, we examined whether VBP has accelerated improvements in the worst performing hospitals using the same analysis applied only to hospitals in the lowest quartile of overall rating in the baseline year (2008) of data.

As sensitivity analyses, we built models that included different samples of hospital data. First we tested our main models on the entire sample of hospitals, not just those reporting data throughout the entire study period. Second, we used coarsened exact matching to create matched samples of VBP and control hospitals, matching on the following categories of hospital characteristics: ownership, size, teaching status, geographical region and rural-urban location (see Appendix 6 (24) for categories). Analyses comparing VBP and control hospitals based on the coarsened sample were weighted according to the stratum size. Finally, we created a more similar overall cohort using the same method as above on the same hospital characteristics but restricting to a 1-to-1 match in order to improve balance between VBP and control hospitals. The second approach (above) preserves more of the original cohort, but provides less balance, while the third approach involves fewer hospitals, which are more closely matched. All analyses were performed using Stata version 14 (STATCorp, College Station, TX).

~~As asensitivity analysis, as described above, we built models that included the entire sample of hospitals, not just those reporting data throughout the entire study period. As a final sensitivity analysis, we used coarsened exact matching to match a subset of 1,038 VBP hospitals to our control~~

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~~hospitals using key hospital characteristics such as ownership, size, teaching status, size and rural-urban location. All analyses were performed using Stata version 14 (STATCorp, College Station, TX).~~

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Limitations

Our study has several limitations. First, the HCAHPS data has low response rates at around 30% for all years. However, as noted elsewhere,(15, 21) prior testing of HCAHPS suggests minimal likelihood of nonresponse bias. Further, it is deemed adequately valid not only to publicly report performance but to be used for hospital payments. Another limitation of the study is the make-up of our control group. Critical Access Hospitals tend to have different structural characteristics from acute care hospitals, and while Maryland hospitals are not exposed to VBP, they have also been subject to a different hospital payment system, and other quality improvement incentives targeting processes of care.(22, 23). ~~Moreover, our control group is made up of a smaller number of hospitals than the VBP hospitals. In part we~~We attempt to address these differences in two ways: 1) by controlling for key hospital characteristics in our models, and 2) by running sensitivity analyses ~~on~~using coarsened exact matching. ~~a smaller subset of matched acute care hospitals.~~ The coarsened exact matching, especially after restriction to 1-to-1

matching, does an excellent job in balancing VBP and control hospital characteristics but it does reduce the number of VBP hospitals. The non-significant difference between the matched subgroups of VBP and control hospitals may not generalize to all VBP hospitals.

Results

Trends in patient experience 2008-2014:

We first examined trends in the overall rating of patient experience over time across 3,452 hospitals that reported data from 2008 to 2014 (Exhibit 1). Over the study period, overall experience increased by 6.7 percentage points (from 64.3% to 70.9%). We further examine the trend in improvement in patient experience before and after the introduction of VBP. In the period 2008-2011, following public reporting of HCHAPS scores, overall rating improved at a faster rate (1.49 [95% CI, 1.41 to 1.56], than in the post VBP period, 2011-2014, (0.55 [95% CI, 0.48 to 0.62]). This slowing of improvement in the post VBP period is also observed for seven of the eight other composite or individual measures of hospital experience, and the other global measure, willingness to recommend (Appendix 1)(24). The change in slope between the pre-VBP and post-VBP periods across the two measures is significant (overall rating -0.94

[95% CI, -1.06 to -0.82]). When we examine the trends in overall experience for the subset of hospitals exposed to the VBP program alone, we find a similar change in the slope over the two periods (-0.96 [95% CI, -1.08 to -0.83]).

Improvement of Patient Experience by Hospital Characteristics

We observed that the greatest yearly improvement across all hospital characteristics was mostly concentrated in the pre-VBP period as opposed to the post-VBP period (Exhibit 2). Hospitals with certain characteristics experience greater improvement after VBP, such as small hospitals (n=1,232), hospitals in the Northeast (n=513) and rural hospitals (n=2,930). However, when we examine the difference in trends of improvement across the two periods we observe a decrease in improvement across all characteristics after the introduction of VBP, apart from public hospitals (n=595).

We also examined whether VBP had any impact on narrowing the variation of performance on patient experience across low and high performing hospitals. To do this we classified VBP hospitals into quartiles of performance, based on the proportion of patients rating a hospital 9 or 10 in the baseline year (2008), with quartile 4 representing the hospitals with the lowest baseline performance (mean value of

51.7%) and quartile 1 representing those with the highest baseline performance (mean value of 77.0%). We found that hospitals in the quartile with the lowest baseline improved the most (+10 percentage points) over the study period, and hospitals starting with the highest baseline, quartile 1, improved the least (+1.3 percentage points) (Exhibit 3). This resulted in the narrowing of the gap between high and low performers from 25% to 15%. However, similar to the results above, most of the improvement in hospitals across all quartiles was concentrated in the pre-VBP period. The change in slope across all quartiles indicates a decrease in the rate of improvement that is significant for all quartiles apart from the hospitals starting with highest baseline performance (Q1 -0.06 [95% CI, -0.29 to -0.18], Q2 -0.70 [95% CI, -0.92 to -0.49], Q3 -0.86 [95% CI, -1.1 to -0.65], Q4 -2.16 [95% CI, -2.47 to -1.84]).

Impact of VBP on patient experience relative to non-VBP hospitals.

We further examine the trend in improvement in patient experience for the two global measures across the VBP and non-VBP groups to determine if the trend differs after the introduction of VBP relative to hospitals not exposed to the policy. Of the 3,452 hospitals, we identified 3,033

hospitals participating in the VBP program and 419 non-VBP hospitals, of which 40 were from Maryland and 379 were Critical Access Hospitals. VBP hospitals were more likely to be large, for-profit, and teaching hospitals compared to non-VBP hospitals and more likely to be located in the Northeast and South (Appendix 2)(24).

Trends in overall hospital rating in the pre-intervention period are similar in the VBP and non-VBP hospitals (1.51% vs. 1.28%, p=0.10), suggesting that the non-VBP hospitals serve as a suitable control for the VBP group (Exhibit 4). Following the introduction of VBP, the rate of improvement in overall hospital rating slows in both groups to 0.56% in VBP hospitals and 0.47% in non-VBP hospitals, and there was no significant difference in trends between VBP and non-VBP hospitals (-0.14% per year, p=0.49). Similarly, there was no significant difference in trends in the willingness to recommend measure (-014% per year, p=0. 54), nor for the remaining measures of patient experience, apart from cleanliness of hospitals, where the improvement slowed more for VBP relative to non-VBP hospitals (-0.41% per year, p=0.05) (Appendix 3)(24). We further examine whether the introduction of VBP was associated with a meaningful improvement of the low performing hospitals (lowest quartile

of baseline performance) relative to non-VBP hospitals, but also find that there is no significant difference in the trend as compared to non-VBP hospitals (0.99%, p=0.22; Appendix 4)(24).

All our results were consistent when we included the full sample of hospitals that reported HCHAPS scores over the study period, and when we included controlled for other factors that may have a potential relation to patient satisfaction such as nurse staffing levels, the percent of Medicaid patients at the hospital, the disproportionate share index and the Herfindahl-Hirschmann index (Appendix 5)(24).

As a final sensitivity analysis we examined the trend in improvement in patient experience for the two global measures across two~~a~~ matched subsamples of the VBP hospitals and critical access hospitals that share common hospital characteristics ~~group with closer characteristics to the non-VBP hospitals~~ (Appendix 6)(24). ~~–~~The results from ~~this~~both analyse~~i~~s show that amongst incentivized and non-incentivized hospitals with similar characteristics there is no significant differential effect after the introduction of the incentive ~~Our results are also consistent when we examine a~~

~~subset of hospitals matched to the control hospital~~ (Appendix 7~~6~~)(24).

Discussion

Patient experience in U.S. hospitals has improved steadily but modestly since 2008, although this improvement has been slowing in recent years despite the introduction of Medicare's VBP program. We found no evidence to suggest that the VBP program drove acceleration in improvement of patient experience beyond secular trends, even among the poorest performers at baseline. Instead we found that since the introduction of VBP improvements in patient experience have slowed down. Certain subsets of hospitals seemed to have made greater improvement in patient experience than others, such as small hospitals, yet the majority of improvement, even for these institutions, occurred prior to VBP. Taken together, these findings call into question whether the national VBP program is having meaningful impact on patient experience.

Our findings hold important implications for policy makers who believe we can still make meaningful gains in patient experience. Relative to non-VBP hospitals we find the only significant difference in patient experience is hospital cleanliness, where improvement in VBP hospitals slowed more.

It is unclear why the improvements seem to have slowed down in recent years and why VBP seems to be doing little to jumpstart these efforts. This is especially puzzling given the more substantial gains after public reporting.(15, 21) One possibility is that the rewards offered to most hospitals under the VBP program are quite modest (25) and thus too small to motivate change, particularly when considering the contribution of each of the eight experience measures. Further, the design of the VBP program is such that it mostly incentivizes improvement amongst the lowest performers. Hospitals starting with high baseline performance have little incentive to invest in improvement, as they will be rewarded through their high achievement. However despite a concentration of improvement in the low baseline hospitals, we find no evidence to suggest that the introduction of VBP is motivating acceleration in improvement of the low performers beyond secular trends (and control hospitals), with the bulk of improvement again concentrated in the pre-VBP period.

Another potential explanation for the lack of impact of VBP may be that mandatory public reporting of HCAHPS measures, and/or the anticipation of VBP, already motivated early improvements, and further improvements have become more

difficult to extract because of a "ceiling effect" whereby marginal gains in experience become harder to achieve after a certain threshold. If this is the case, we would expect to see all hospital improvement leveling off at the same 'ceiling'. We do find that baseline score is associated with improvement across the entire study period, whereby hospitals starting with the highest baseline experience very little improvement and hospitals starting with the lowest baseline score experience the most improvement. However, we see a large number of hospitals able to achieve scores substantially greater than the national average, calling into question the theory that the national average represents some sort of natural ceiling of performance.

One possible explanation is that certain structural hospital factors are strong predictors of HCHAPS performance. Prior work showed that safety net hospitals, teaching hospitals, large hospitals and hospitals with ICUs achieved lower HCHAPS scores in 2014. (10) Additionally, McFarland and colleagues note that certain demographic and structural factors such as large hospital size and non-English speaking populations strongly predict unfavorable HCAHPS scores, and are not adequately adjusted for by current CMS adjustment methods.(26) This suggests that different groups of hospitals

may experience differential ceiling effects possibly because of differences in their underlying patient populations. As such, policy makers may want to consider further adjusting current measures for additional patient characteristics, or experiment with new measures of patient experience, to put hospitals on a level playing field.

Our findings are consistent with the limited work examining trends in patient experience in the past decade. Elliot et al examined trends in patient experience in the early years of reporting, noting promising improvements across hospitals.(15, 21) In their evaluation of the first year of VBP, (14) showed no effect of the financial incentive on patient experience. While, a Government Accountability Office (GAO) report showed that trends in median hospital patient experience scores were increasing steadily over time, they did not assess whether the impact of the VBP policy. Our findings build upon this work, formally examining the impact of VBP, three years into the policy.

This work raises important issues for policymakers and clinical leaders to consider. First, it adds to a growing body of literature that suggests U.S. pay-for-performance schemes have had little to no effect in driving meaningful

improvements in other patient outcomes.(14, 27-29) With the recent announcement from the U.S. government that more payments will be further tied to value-based programs like VBP, we need to seriously consider whether we need to redesign the policies in ways that more substantially impact patient experience. Furthermore, as versions of patient experience surveys continue to be rolled out in other care settings, including home health, dialysis centers, hospice, and outpatient/ambulatory settings, more work is needed to better understand what influences improvement in these measures.

Conclusion:

In summary, we found that patient experience has improved modestly over time, with no evidence that the introduction of incentives under VBP led to meaningful gains in patient experience. Our study suggests that as we seek to continue to promote more value-based payments, ensuring that they are structured in ways that lead to better patient experience is critical. We need alternative approaches to the ones being used. Whether they are stronger incentives, more narrowly focused metrics, or something else altogether, new programs and experiments would be helpful to better understand how to improve the experience of patients in U.S. hospitals.

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24. To access the Appendix, click on the Appendix link in the box to the right of the article online.

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EXHIBIT LIST

Exhibit 1 (figure)

Caption: Percent of patients reporting an overall Experience of 9-10 for all hospitals and VBP hospitals, (2008-2014).

Source/Notes: SOURCE Authors analyses of publicly reported HCAHPS data available through CMS (2008-2014).

Exhibit 2 (table)

Caption: Hospital Characteristics associated with Improvement in VBP hospitals

Source/Notes: SOURCE Authors analyses of publicly reported HCAHPS data available through CMS and the American Hospital Association (AHA) annual survey (2008-2014).

Exhibit 3 (figure)

Caption: Percent of patients reporting an overall Experience of 9-10 by Quartile of Baseline Performance

Source/Notes: SOURCE Authors analyses of publicly reported HCAHPS data available through CMS (2008-2014).

Exhibit 4 (table)

Caption: Difference in trends of overall patient experience between VBP hospitals and non-VBP hospitals

Source/Notes: SOURCE Authors analyses of publicly reported HCAHPS data available through CMS (2008-2014).

NOTES These results are based on a random-effects segmented regression analysis, allowing for different slopes in the pre- and post-intervention period, and between VBP hospitals and non-VBP hospitals. We adjusted for hospital characteristics including region, profit status, hospital size, teaching status, urban/rural location, presence of MICU and clustered standard errors at the hospital level.

Exhibit 2: Hospital Characteristics associated with Improvement in VBP hospitals

Hospital Characteristics	% Yearly Improvement					
	PreVBP	p-value	PostVBP	p-value	(PostVBP-PreVBP)	p-value
Hospital Size						
Small (0-99 beds)	1.2%		0.6%		-0.6%	
Medium (100-399 beds)	1.6%	p<0.001	0.2%	0.03	-1.4%	0.05
Large (400+ beds)	1.6%		0.1%		-1.5%	
Teaching Status						
Major	1.4%		0.5%		-0.9%	
Minor	1.5%	0.12	0.5%	0.25	-1.0%	0.43
Non-Teaching	1.6%		0.7%		-0.9%	
Ownership						
For-Profit	2.0%		0.0%		-2.0%	
Private non-profit	1.4%	0.003	1.2%	p<0.001	-0.2%	p<0.001
Public	1.3%		1.5%		0.2%	
Region						
Northeast	1.1%		0.7%		-0.4%	
Midwest	1.5%	p<0.001	0.2%	0.03	-1.3%	0.03
South	1.5%		0.0%		-1.5%	
West	1.7%		-0.1%		-1.8%	
Urban						
urban	1.5%	0.49	0.2%	0.03	-1.4%	0.77
rural	1.2%		0.7%		-0.5%	
MICU						
has MICU	1.0%	0.005	-0.2%	0.21	-1.2%	0.015
no MICU	0.9%		0.0%		-0.9%	

Exhibit 4: Difference in HCHAPS trends between VBP hospitals and non-VBP hospitals

	Yearly change in experience (%)		Difference-in-difference (%) [95% CI]	P-value for Diff-in-Diff
	VBP Hospitals	non-VBP Hospitals		
Overall Experience (9&10)				
Pre-intervention	1.51%	1.28%	-0.14% [-0.56% to 0.30%]	0.49
Post-intervention	0.56%	0.47%		
Difference [95% CI]	-0.93% [-1.13% to -0.74%]	-0.81% [-1.19% to -0.43%]		
Definitely Recommend Hospital				
Pre-intervention	0.84%	0.72%	-0.14% [-0.61% to 0.32%]	0.54
Post-intervention	0.16%	0.19%		
Difference [95% CI]	-0.68% [-0.89% to -0.44%]	-0.54% [-0.13% to -0.11%]		

*These results are based on a random-effects segmented regression analysis, allowing for different slopes in the pre- and post-intervention period, and between VBP hospitals and non-VBP hospitals. We adjusted for hospital characteristics including region, profit status, hospital size, teaching status, urban/rural location, presence of MICU, and clustered standard errors at the hospital level.