ORIGINAL ARTICLE

Hospital value based purchasing scores highly associated with prior year score and organizational characteristics

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Received: December 2, 2018 **Accepted:** January 21, 2019 **Online Published:** January 28, 2019
DOI: 10.5430/jha.v8n1p50 **URL:** https://doi.org/10.5430/jha.v8n1p50

ABSTRACT

Objective: Medicare's Hospital Value Based Purchasing program (HVBP) rewards hospitals which achieve a higher than mean Total Performance Score (TPS). This article investigates the relationship between hospital characteristics and prior year Total Performance Score (TPS) on current year TPS under Medicare's HVBP program.
Methods: Regression analyses are used to investigate the relationship between prior year TPS and organizational characteristics on current year TPS.
Results: Regression analyses show that certain geographic locations, smaller bed size, and lower disproportionate share hospital percentage (DSHPCT) lead to a statistically significantly higher TPS in both FY 2015 and FY 2016. Teaching status is associated with higher scores in FY 2015 and lower scores in FY 2016. Furthermore, prior year TPS is a significant predictor of current year TPS.
Conclusions: Results suggest HVBP performance is dependent upon organizational characteristics which may have little to do with quality or cost of care. Furthermore, the findings demonstrate that prior year HVBP performance is the strongest predictor of future performance which may impede low performing hospitals from achieving success in future years, despite significant gains in improving cost and quality.

Key Words: Value based purchasing, Incentive payments, Pay-for-performance

1. INTRODUCTION

Paying for healthcare, especially by third-party payers (i.e., health insurance plans), is the subject of much debate in the United States. One popular model promoting quality is to link measured performance, or perceived value, to the amount of payment a health care provider may receive, a program referred to as "pay for performance" (P4P). This is typically done by linking payment to certain quality measures, such as lower rates of catheter associated urinary tract infections. These measures, however, are merely an estimation of value. Previous P4P programs have shown improvement in adherence to clinical guidelines, decreased length of stay, increased access to preventative measures, and decreased mortality.[1–4] However, when measuring the cost

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effectiveness of these programs, researchers have come up with inconclusive results.[1–3,5] Therefore, research must still be done to determine if these outcomes align with increased "value".

In the United States, the Hospital Value-Based Purchasing (HVBP) Program is a new P4P program which was created by the Patient Protection and Affordable Care Act (PPACA).[6] The HVBP program started paying hospitals in fiscal year (FY) 2013 and currently includes over 3,000 acute-care hospitals. The HVBP program is mandated for all acute care hospitals receiving payment from Medicare's Inpatient Prospective Payment System.[7] To assign bonuses or penalties, a total performance score (TPS) is calculated for each hospital. In 2015 and 2016 the TPS included Patient Experience scores (from the Hospital Consumer Assessment of Healthcare Providers and Systems), Clinical Process scores, Efficiency scores, and Outcome scores. HVBP is a budget-neutral program; HVBP withholds a percentage of each participating hospital's Diagnosis-Related Group payments and redistributes the money based on performance. Initially, the program withheld one-percent of payments and increased to two-percent by 2017, thereby increasing the magnitude of the financial incentives.

The HVBP program has thus far yielded disappointing results. The measurements for the HVBP program began in 2011; however, payouts did not begin until 2013.[8] Initial studies have failed to find an improvement in patient satisfaction or clinical process scores, and there was no change in initial mortality.[9,10] More recent studies have shown that hospitals with a higher TPS do not necessarily have a decreased amount of hospital acquired conditions, bringing in to question whether the HVBP program is rewarding quality appropriately.[11]

While the HVBP program has not shown the ability to affect overall change or to improve the overall quality of healthcare, it is valuable to study hospitals that are earning higher TPS scores to better understand factors that influence improvement within individual hospitals. Studies have already shown that certain types of hospitals, such as physician-owned and for-profits, and smaller bed size are able to achieve higher TPS.[12–14] Although the HVBP TPS is not intended to be directly determined by hospital characteristics, prior research has suggested an association in numerous hospital characteristics and TPS scores. This questions the program's ability to reward hospitals for value based care. This paper furthers the current research, using updated data and expanded hospital characteristics, to investigate 1) if a relationship exists between a hospital's TPS and certain structural characteristics (e.g., teaching status, geographical region, number of beds, disproportionate share, and hospital ownership), and 2) if the hospitals' prior year TPS predicts the current year TPS, after controlling for the structural characteristics.

2. METHODS

2.1 Variables and data source

Regression models were used to assess the relationship between a hospital's TPS and its characteristics. The dependent variable of interest was each hospital's TPS. The independent variables included academic status, geographical location, disproportionate share percentage, number of beds, and ownership type. The TPS for participating hospitals were retrieved from the dataset titled Hospital Value-Based Purchasing – Total Performance Score which included "a list of hospitals participating in the HVBP Program and their Clinical Process of Care domain scores, Patient Experience of Care dimension scores, and Total Performance Scores" was obtained from the publicly available Hospital Compare website.[15] There are 3,031 hospitals that participated in Medicare's HVBP Program in FY 2015 and FY 2016; 2,957 of these had a TPS both years and were included in this analysis. The FY 2015 data was published in October 2014, and the FY 2016 data was published in October 2015. Hospital teaching status was defined as hospital membership in the Council of Teaching Hospitals (COTH). This data was obtained from the Association of American Medical Colleges Council of Teaching Hospitals website in October 2016.[16] Additionally, the Medicare FY 2016 Impact File was sourced for the following organizational variables geographic region, the percentage of disproportionate share patients, number of beds, and ownership.[17] This file was published in October 2015.

2.2 TPS calculation

The TPS is calculated using four weighted domain scores: Patient Experience of Care, Clinical Process of Care, Efficiency, and Outcome.[6] In FY 2015, there were 12 Clinical Process of Care measures (20%), eight Patient Experience of Care measures (30%), five Outcome measures (30%), and one Efficiency measure (20%). The total points for each domain was multiplied by its percentage weight and added together to obtain a final TPS, with a maximum of 100. For FY 2016, five Process of Care measures were removed and one new one was added, as were two new Outcome measures. Thus for FY 2016, the domains and their respective weights were adjusted to eight Clinical Process of Care (10%), five Patient Experience of Care (25%), seven Outcomes measures (40%), and one Efficiency (25%).[15] The Patient Experience of Care domain score was the sum of the hospital's Hospital Consumer Assessment of Healthcare Providers and System (HCAHPS) score and the hospital's HCAHPS Consistency

score. HCAHPS is a survey created and distributed by CMS to assess patient satisfaction with 27 questions.[18] CMS synthesizes the performance of all hospitals for each quality measure and designates the 50th-percentile as the threshold level and the top decile as the benchmark level. For an individual hospital, CMS awards Achievement and Improvement points based on the hospital's performance relative to the threshold and benchmark level, respectively, for a given quality measure. Performance below the threshold receives zero points for both Achievement and Improvement. Performance at or above the threshold, but below the benchmark, is awarded 0-10 Achievement points or 0-9 Improvement points. Finally, performance at or above the benchmark level receives either 10 Achievement points or 9 Improvement points. CMS then takes the higher of the two types of points per measure, Achievement or Improvement, and used that number to calculate domain scores. Each domain score was then multiplied by its weight (percentage) and then added together to generate the TPS, with a maximum score of 100.[6]

Table 1. Descriptive Statistics

Characteristics	*n*	FY 2015 TPS	FY 2016 TPS
		Mean (SD)	Mean (SD)
COTH			
non-Academic	2,758	42.009 (12.504)**	40.822 (12.475) **
Academic	199	36.324 (10.207)	32.737 (8.635)
REGION			
New England	128	41.161 (9.786)**	39.810 (9.296)**
Mid-Atlantic	346	38.002 (11.457)	36.010 (11.285)
South Atlantic	495	40.967 (11.504)	40.097 (11.872)
East North Central	474	42.159 (11.623)	40.873 (11.653)
East South Central	264	42.318 (12.971)	40.541 (12.815)
West North Central	242	46.678 (13.287)	44.088 (13.253)
West South Central	432	42.153 (12.988)	40.644 (13.416)
Mountain	207	41.231 (12.622)	40.554 (13.589)
Pacific	369	41.187 (13.511)	40.646 (12.320)
OWNERSHIP			
Government	692	42.162 (12.660)	40.822 (12.785)
Non-profit	1,747	41.321 (12.377)	40.018 (12.092)
Physician	30	42.036 (8.144)	40.901 (10.866)
Proprietary	488	41.939 (12.583)	40.396 (13.126)

** $p < .01$;
Note. *n* = frequency; Asterisk denotes significance in the characteristic group.

2.3 Statistical models

Statistical tests, ANOVA and t-tests, were performed for each of the hospital characteristics to determine if there were annual TPS differences between levels of these variables. Three generalized linear models (GLM) were run to assess the two aims: 1) to identify if hospital characteristics in a specific year were significantly related to hospital TPS in the same year (2015 and 2016), and 2) to ascertain whether a hospital's TPS value in one year (2015) had predictive value for the hospital's TPS in the following year (2016) while controlling for identified hospital characteristics. The first GLM had as its dependent variable TPS 2015 while the second two GLMs used TPS 2016 for their dependent variable. All models incorporated independent variables of hospital characteristics: membership in the college of teaching hospitals (COTH) status (yes/no), ownership type (for nonprofit, physician-owned, proprietary, and government owned), each hospital's geographic region (Mid-Atlantic, South Atlantic, East North Central, East South Central, West North Central, West South Central, Mountain, Pacific, and New England), the percentage of disproportionate share patients, and the number of beds. Residuals were analyzed for adherence to assumption requirements.

3. RESULTS

The results of the descriptive statistics analyses showed significant differences in TPS between teaching and non-teaching hospitals and geographic regions; however, no significant differences in TPS were shown between ownership types (see Table 1).

Prior to performing the regression analyses, the variables were tested to assure that there was no multicollinearity among the predictor variables ($p < .01$), that the hypothesized predictor variables individually exhibited some linear association with hospital TPS values, and that the predictor variables did not violate the normality assumption. Initially the GLM model residuals exhibited non-normality. Therefore, the disproportionate share variable was transformed by multiplying it by 100 and the bed variable was transformed by dividing its square root into one to improve model performance.

The two single-year models on the prediction of annual TPS values yielded similar results for geographic region, percentage of disproportionate share, and number of beds ($p < .05$). However, for TPS 2015, academic status was not significant ($p > .05$) while ownership type was significant ($p < .05$) with negative coefficients for government, physician-owned and proprietary hospitals. For TPS 2016, academic status was significant ($p < .05$), with teaching hospitals earning lower TPS, but ownership type was not significant ($p > .05$).

Evaluation of the model estimates for aim 1 indicated no difference between teaching and non-teaching hospitals in 2015; yet, teaching hospitals earned a lower TPS in 2016 with the average being 2.049 points lower, all else held constant. Geographic region also displayed some explanatory effect. In 2015, with Pacific serving as the base region, five regions showed statistically significant difference ($p < .05$), none of which exhibited higher average TPS values. The Mid Atlantic had the largest difference when compared to the Pacific, earning an average of 4.508 points lower ($p < .0001$).

In 2016, there were seven regions that differed significantly ($p < .05$) from the Pacific region, again with the Mid Atlantic testing lower than the Pacific by 5.085 points. Higher rates of disproportionate share and greater bed size equated to lower TPS values in both years ($p < .0001$). These findings were consistent between FY 2015 and FY2016, and have not been explored in prior literature. However, the model results suggested the effect of disproportionate share and bed size have a diminished, though significant ($p < .0001$), effect over time.

Table 2. TPS Regression Analysis, Single and Combined Year

	Single Year, 2015			Single Year, 2016			Combined Year, 2016		
	Estimate	**95% CI**	***p***	**Estimate**	**95% CI**	***p***	**Estimate**	**95% CI**	***p***
AIC	**7.604**			**7.641**			**7.065**		
CONSTANT	37.046	(35.0, 38.1)	.000	36.313	(32.5, 40.1)	.000	11.011	(9.1, 12.9)	.000
COTH*	1.227	(-0.24, 2.7)	.102	-2.049	(-3.9, -0.18)	.031	-1.307	(-2.2, -0.4)	.004
REGION**									
New England	-2.827	(-4.9, -0.7)	.007	-2.537	(-4.4, -0.6)	.008	-1.071	(-2.6, 0.4)	.162
Mid Atlantic	-4.508	(-6.2, -2.8)	.000	-5.085	(-6.6, -3.5)	.000	-2.478	(-3.7, -1.3)	.000
South Atlantic	-1.179	(-2.8, 0.4)	.142	-1.729	(-3.3, -0.2)	.029	-0.357	(-1.4, 0.7)	.522
East North Central	-1.877	(-3.5, -0.3)	.020	-1.687	(-3.1, -0.2)	.028	-0.952	(-2.1, 0.2)	.092
East South Central	-0.928	(-2.8, 0.95)	.332	-2.144	(-3.9, -0.3)	.019	-1.824	(-3.3, -0.4)	.010
West North Central	0.866	(-1.04, 2.8)	.373	-0.113	(-2.0, 1.8)	.908	-1.425	(-2.8, -0.07)	.040
West South Central	-2.750	(-4.4, -1.6)	.001	-3.635	(-5.3, -2.0)	.000	-2.361	(-3.6, -1.2)	.000
Mountain	-2.895	(-4.8, -0.97)	.003	-2.262	(-4.3, -0.2)	.029	-1.213	(-2.8, 0.4)	.131
DSHPCT100	-0.129	(-0.16, -0.1)	.000	-0.10	(-0.13, -0.1)	.000	-0.01	(-0.03, 0.01)	.375
1/SQRT(Beds)	114.771	(102.6, 126.9)	.000	98.713	(61.7, 135.7)	.000	69.486	(58.7, 80.3)	.000
OWNERSHIP***									
Government	-1.322	(-2.5, -0.1)	.030	0.428	(-1.0, 1.9)	.558	-0.025	(-0.97, 0.9)	.959
Physician	-0.729	(-6.0, 4.6)	.788	2.387	(-3.9, 8.7)	.458	-0.637	(-4.7, 3.5)	.761
Proprietary	-2.333	(-3.4, -1.3)	.000	-1.126	(-2.3, 0.09)	.071	-0.446	(-1.3, 0.4)	.296
TPS 2015	NA		NA	NA		NA	0.589	(0.56, 0.62)	.000

Note. DSHPCT100: The percent of disproportionate share multiplied by 100. 1/SQRT (Beds): The weighted value of the number of licensed beds in a hospital.
*Non-teaching is the base level, **Pacific area is the base level, ***Non-profit ownership is the base level.

The second aim of this paper was to examine the potential effect of 2015's TPS value on 2016's. The combined (third) model's result indicates that hospitals can predict TPS to be roughly 0.6 for every 1 point of TPS earned in 2015, while holding all of the other variables constant. The effect of the hospital characteristics, other than disproportionate share and ownership type, remained significant ($p < .05$), when prior year TPS was a model variable. Similar to the individual TPS year models, the estimates showed teaching hospitals had lower TPS scores (1.307 points) on average. And, hospitals in the Mid Atlantic underperformed their Pacific peers by 2.478 points with hospitals in the West South Central closely behind earning an average of 2.361 points less ($p < .05$). Like the individual year models evaluating aim 1, hospitals with a higher number of beds earned lower TPS scores. Interestingly, when compared to the individual TPS 2016 model, all of the variable estimates showed a reduced effect on TPS 2016 due to TPS 2015 being included in the model. This is likely due to TPS 2015 accounting for some of the variation inherent in these hospital characteristics (see Table 2).

4. Discussion

CMS's HVBP is an attempt at estimating and rewarding hospitals for value. The rewards and penalties in the program hinge on the TPS's ability to reflect value. The findings of this research bring into question whether that central goal is achieved. The first research aim sought to understand hospital characteristics associated with the FY 2015 and FY 2016 TPS values. DSHPCT and bed size are negatively correlated with TPS performance, indicating that larger hospitals providing care to needy populations are earning a lower TPS. Additionally, this study showed hospitals in the Pacific earned higher TPS values than their counterparts in other geographic regions. Of particular interest, past research

showed a mix of supportive and contradictory findings when compared to others who used earlier and/or the same (FY 2015) years of data.[14, 18, 19] This may be explained by the changes in HVBP domains, weights given to each domain, and measures within a domain, or the method by which the covariates were controlled in each study. With respect to academic hospitals, the regression models revealed that academic status was associated with a higher TPS in 2015; yet, academic status was associated with lower scores in 2016 even after controlling for disproportionate share and bed size. Prior research, as well as the descriptive statistics in Table 1, also suggested that hospitals with academic status were at a disadvantage.[13, 20] Given these findings, academic hospitals, or other large hospitals that provide care for the underserved, or both, may be disadvantaged in the HVBP program.

The second research aim sought to determine the association, if any, between a prior year TPS value and the current year TPS. The results showed TPS is highly dependent on the prior year's score, thus making it difficult for hospitals to improve and gain rewards in a timely manner within the program. Despite CMS's methodology allowing hospitals to earn improvement points, hospitals that start below the average may never catch up to those starting above the average while the top performing hospitals may continually have an advantage. As a result, it appears that lower performing hospitals will continually be penalized in the short term, implying that the program will not reward or incentivize as intended.

The correlation between TPS values, hospital characteristics and past TPS performance challenges the HVBP program, which claims to reward value. Additionally, the TPS calculation included process of care and efficiency measurements, which may not meet the definition of value.[21] Multiple researchers agree that value should be patient-based and follow patients throughout their care; however, the measurements in TPS are more systems-based.[22] While these measures are easier to collect on a hospital level as opposed to patient level data, this may affect the program's ability to reward value-based care. The competitive nature of the reward system is also problematic for lower performing hospitals. These findings suggest that hospitals who did not meet the 2015 TPS threshold (i.e. monetarily penalized) may struggle to attain the level of TPS necessary to achieve a reward in subsequent years. Thus, if the intent of HVBP is to reward value, CMS may need to re-evaluate the measurement components of TPS to assure that "value" is more accurately approximated each year and financial rewards are achievable by all participating hospitals within any given year.

Study limitations

The limitations of this study included the definition of academic hospitals, the calculation of TPS, including the weighted methodology, and the lack of year to year adjustment. Specifically, academic hospitals were defined by their membership status in the Council of Teaching Hospitals; however, there are hospitals not listed in the Council of Teaching Hospitals that do participate in academic medicine. Additionally, not all hospitals report the same number of measures, so while this study compared TPS scores, the TPS score may be skewed by the re-weighting of the domains when not all measures are reported. Similarly, the HVBP measures are modified each year, thus the computation factors that comprise the TPS score were not identical between 2015 and 2016. However, weighted TPS scores and year-to-year comparison is supported by CMS.[18] Last, this research did not employ a mixed model to account for the year-to-year TPS covariance; future research should include additional years and directly adjust for autocorrelation.

5. Conclusions

Defining and measuring value is the central challenge of CMS's HVBP program. CMS leaders need to evaluate how well TPS performance aligns with and measures organizational quality, irrespective of inherent hospital characteristics. This analysis revealed that hospitals with a lower disproportionate share, fewer beds, in the Pacific region, and non-academic earn a higher TPS, on average. Additionally, the prior year TPS is correlated with the current year TPS, which may be another effect of unchangeable hospital characteristics. While this research informs practitioners of the hospital characteristics that can affect TPS, the reasons why and/or mechanisms to overcome these inherent organizational barriers remains unclear. In order to best understand the implications of this research, practitioners should evaluate their own organizations to ascertain the impact of these organizational characteristics on their ability to improve the TPS measures. As the development of P4P programs continues, the definition of value needs to be established and models develop to assure measurements are accurately portraying the quality of care delivered and to enable comparative research on value based care.[22] Last, policy makers should to assess whether HVBP truly incentivizes and rewards the delivery of quality healthcare at all hospitals, or whether there are organizations that may be inappropriately penalized by the current TPS system.

Conflicts of Interest Disclosure

The authors declare they have no conflicts of interest.

REFERENCES

[1] Mehrotra A, Damberg CL, Sorbero MES, et al. Pay for performance in the hospital setting: what is the state of the evidence? Am J Med Qual. 2009 Jan; 24(1): 19-28. PMid:19073941. http://doi.org/10.1177/1062860608326634

[2] Van Herck P, De Smedt D, Annemans L, et al. Systematic review: Effects, design choices, and context of pay-for-performance in health care. BMC Health Serv Res. 2010 Aug; 10(1): 1-13. PMid:20044945. http://doi.org/10.1186/1472-6963-10-247

[3] Eijkenaar F, Emmert M, Scheppach M, et al. Effects of pay for performance in health care: A systematic review of systematic reviews. Health Policy. 2013 May; 110(2–3): 115–130. PMid:23380190. http://doi.org/10.1016/j.healthpol.2013.01.008

[4] Kristensen SR, Meacock R, Turner AJ, et al. Long-Term Effect of Hospital Pay for Performance on Mortality in England. N Eng J Med. 2014 Aug; 371(6): 540–548. PMid:25099578. http://doi.org/10.1056/NEJMoa1400962

[5] Emmert M, Eijkenaar F, Kemter H, et al. Economic evaluation of pay-for-performance in health care: a systematic review. Eur J Health Econ. 2012 June; 13(6): 755–767. PMid:21660562. http://doi.org/10.1007/s10198-011-0329-8

[6] Department of Health and Human Services. 2015. Hospital Value Based Purchasing. Washington, DC: U.S. Government Printing Office.

[7] CMS.gov [Internet]. Baltimore: Centers for Medicare and Medicaid Services. c-2019. Acute Care Hospital Inpatient Prospective Payment System. 2018 Mar. [June 3, 2018]. Available from: https://www.cms.gov/outreach-and-Education/Medicare-Learning-NetworkMLN/MLNProducts/downloads/acutepaymtsysfctsht.pdf

[8] Hospital Compare Dataseta [Internet]. Baltimore: Centers for Medicare and Medicaid Services. 2016 [cited 2017 January 16]. Available from: https://data.medicare.gov/data/hospital-compare

[9] Ryan AM, Burgess JF, Pesko MF, et al. The early effects of Medicare's mandatory hospital pay-for-performance program. Health Serv Res. 2015 Feb; 50(1): 81–97. PMid:25040485. http://doi.org/10.1111/1475-6773.12206

[10] Figueroa JF, Tsugawa Y, Zheng J, et al. Association between the Value-Based Purchasing pay for performance program and patient mortality in US hospitals: observational study. BMJ. 2016 May; 353: i2214. PMid:27160187. http://doi.org/10.1136/bmj.i2214

[11] Spaulding A, Zhao M, Haley DR. Value-based purchasing and hospital acquired conditions: are we seeing improvement? Health Policy. 2014 Dec; 118(3): 413–421. PMid:25459736. http://doi.org/10.1016/j.healthpol.2014.10.003

[12] Chatfield JS. Value-Based Purchasing: The Effect of Hospital Ownership and Size. Health Care Manag. 2016 Jul-Sep; 35(3): 199–205. http://doi.org/10.1097/HCM.0000000000000116

[13] Ramirez AG, Tracci MC, Stukenborg GJ, et al. Physician-Owned Surgical Hospitals Outperform other Hospitals in the Medicare Value-Based Purchasing Program. J Am Coll Surg. 2016 Oct; 223(4): 559–567. PMid:27502368. http://doi.org/10.1016/j.jamcollsurg.2016.07.014

[14] Borah B, Rock M, Wood D, et al. Association between value-based purchasing score and hospital characteristics. BMC Health Serv Res. 2012 Dec; 12(1): 464. PMid:23244445. http://doi.org/10.1186/1472-6963-12-464

[15] CMS.gov [Internet]. Baltimore: Centers for Medicare and Medicaid Services. c-2016. Innovations Center; 2016 Jul 08. [May 7, 2017] Available from: https://innovation.cms.gov/about/Our-Mission/index.html

[16] Association of American Medical Colleges [Internet]. Washington, DC: Association of American Medical Colleges; C -2019 AAMC Hospital/Health System Members; [cited 2016 October 20]. Available from: https://members.aamc.org/eweb/DynamicPage.aspx?site=AAMC&webcode=AAMCOrgSearchResult&orgtype=Hospital/Health%20System

[17] CMS.gov [Internet]. Baltimore: Centers for Medicare and Medicaid Services. c-2016. Details for title: FY 2016 Final Rule and Correction Notice Data Files; 2016 [cited 2017 January 16]. Available from: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY2016-IPPS-Final-Rule-Home-Page-Items/FY2016-IPPS-Final-Rule-Data-Files.html

[18] CMS.gov [Internet]. Baltimore: Centers for Medicare and Medicaid Services. c-2014. Hospital Value Based Purchasing (VBP) Program: Trend Analysis; 2014 July 22. [cited 2018 June 2]. Available from: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/HVBP/HVBP-Trend-Analysis.pdf

[19] Zhao M, Spaulding A, Hamadi H. Hospital Characteristics and their Impact on Value-Based Purchasing. Austin J of Public Health Epidemiol. 2015 Nov; 2(3): 1–5.

[20] Zhao M, Haley DR, Spaulding A, et al. Value-Based Purchasing, Efficiency, and Hospital Performance. Health Care Manag. 2015 Jan-Mar; 34(1): 4–13. http://doi.org/10.1097/HCM.0000000000000048

[21] Porter ME. What is value in health care? N Eng J of Med. 2010 Dec; 363(26): 2477-2481. PMid:21142528. https://doi.org/10.1056/NEJMp1011024

[22] Mkanta WN, Katta M, Basireddy K, et al. Theoretical and methodological issues in research related to value-based approaches in healthcare. J Healthc Manag. 2016 Nov; 61(6): 402-418. PMid:28319958. https://doi.org/10.1097/00115514-201611000-00005