

The Effect of Value-Based Purchasing Programs on Reducing Adverse Hospital Outcomes and Improving Overall Hospital Performance

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STUDY GOALS

Evaluate the impact of three CMS Value-Based Purchasing (VBP) programs: (1) Hospital Value-Based Purchasing (Hospital VBP) Program, (2) Hospital-Acquired Condition Reduction Program (HACRP), and (3) Hospital Readmissions Reduction Program (HRRP) on: (i) how hospital performance on program-targeted health outcomes changed over time, and (ii) whether the programs are incentivizing care improvement. Findings represent a subset of analyses from the full Option Year 3 Combined Hospital Evaluation Report.

METHODOLOGY

Key Metrics

- Raw Adverse Outcome Count:** Raw, non-risk-adjusted¹ outcomes from data on HRRP readmission measures, the HACRP Patient Safety Indicator 90 measure, as well as Healthcare-Associated Infection (HAI) measures.^{2,3}
- Hospital Patient Composition:** Each hospital's patient composition, calculated based on 2021 inpatient claims and beneficiary data.
- Owner Type Change:** Yes/no indicator of whether hospital owner type changed from one category to another (Proprietary, Voluntary Nonprofit, or Governmental), based on Cost Report data.

Analysis Methodology

Table 1 shows results from **Difference-in-Difference (DiD)** analyses examining whether stays within hospitals eligible for HRRP had a lower likelihood of readmission relative to ineligible hospitals (Maryland and Critical Access Hospitals) during periods when HRRP was in effect. Using Medicare FFS inpatient claims data, we estimated logit regression models with each condition-specific readmission type (AMI, heart failure, pneumonia, and COPD) as the dependent variable, along with the following covariates: a treatment group indicator (HRRP eligible or not), time period indicators, interaction terms between treatment and time period, and a set of stay-level risk adjusters.

Table 2 shows results from **Ordinary Least Squares (OLS)** regression analyses that examined the association between a change in hospital owner type and program outcomes. The program summary score (Total HAC Score, HRRP Performance Score, and Hospital VBP Total Performance Score) were each regressed on indicators capturing the owner type change, along with the following independent variables: hospital characteristics, patient composition, and a flag denoting whether hospital ownership remained unchanged.

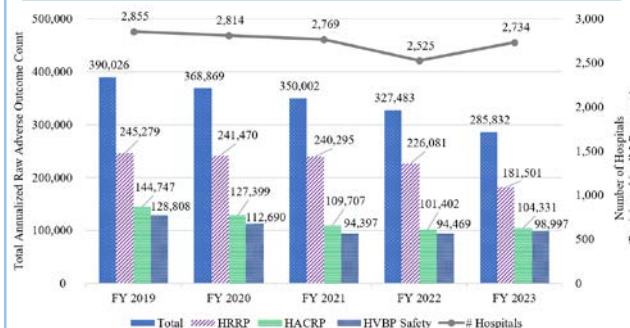
¹ Measures where non-risk-adjusted data were unavailable were excluded.

² HAI measures are included in both HACRP and Hospital VBP. They are not double-counted in the cross-program total.

³ All 2020Q1-Q2 data are excluded due to the COVID-19 Public Health Emergency (PHE) unless otherwise specified. Additionally, 2020Q3 and 2020Q4 data are excluded from FY2022 Total HAC Score.

KEY FINDINGS

Figure 1. Annualized Raw Adverse Outcome Count, FY2019-FY2023 Payment Determination Years (PDYs)



See Key Metrics for additional details on Adverse Outcome Count definition.

Figure 1: Between FY2019-FY2023 PDYs, cross-program raw adverse outcome totals decreased among VBP-eligible hospitals. However, since FY2022 PDY, there has been an **increase in Hospital VBP Safety and HACRP adverse outcomes**, which may be attributable to the overlap of FY2023 PDY performance periods with the COVID-19 PHE.

Table 1. Likelihood of Readmission † over Time by HRRP Eligibility, 4/01/2009 - 6/30/2021†

Difference in Change in 30-day Log Odds of Raw Readmission Rate from Pre-HRRP Period	AMI	
	Coeff.	95% CI
HRRP Participation * Time Period 2 (4/1/10-6/30/11)	0.001	(-0.09, 0.09)
HRRP Participation * Time Period 3 (7/1/11-12/31/11)	0.04	(-0.08, 0.15)
HRRP Participation * Time Period 4 (1/1/12-6/30/14)	0.07	(-0.01, 0.14)
HRRP Participation * Time Period 5 (7/1/14-6/30/16)	0.10*	(0.01, 0.18)
HRRP Participation * Time Period 6 (7/1/16-6/30/21)	0.11**	(0.03, 0.18)

* $p < 0.05$; ** $p < 0.01$; † Inverse outcome, meaning a negative coefficient indicates better performance; ‡ 2020Q1-Q2 data not are excluded from this analysis. Coeff.=Coefficient; CI=Confidence Interval

"Time Periods" reflect dates related to Hospital VBP and HACRP implementation, and HRRP measure set expansions: 1 - Pre-HRRP implementation, beginning 4/1/2009; 2 - Start of HRRP until start of Hospital VBP; 3 - Start of Hospital VBP until start of HACRP; 4 - Start of HACRP until addition of HRRP COPD/THA/TKA; 5 - HRRP COPD/THA/TKA addition until addition of HRRP CABG; 6 - Post HRRP CABG addition. See Analysis Methodology for additional details on DiD specifications.

Table 1: In the post-July 2014 time periods (Time Periods 5, 6), the **HRRP-eligible hospital group experienced a smaller reduction in AMI readmission rates than HRRP-ineligible hospitals**. Findings were similar for other readmission outcomes examined.

Table 2. Effect of Owner Type Change on Measure Performance, FY2017-FY2022 PDYs

Program Performance Score	HACRP†	HRRP†	Hospital VBP
Independent variables	Coeff. (95% CI)	Coeff. (95% CI)	Coeff. (95% CI)
Previously: Proprietary			
Currently: Voluntary Nonprofit	-0.14* (-0.27, -0.003)	-0.002 (-0.01, 0.01)	-4.30** (-7.05, -1.55)
Currently: Governmental	-0.19 (-0.55, 0.18)	0.02 (-0.01, 0.05)	-14.45** (-23.34, -5.56)
Previously: Governmental			
Currently: Voluntary Nonprofit	-0.15 (-0.35, 0.06)	-0.02* (-0.03, -0.003)	2.46 (-1.81, 6.73)
Currently: Proprietary	-0.23 (-0.80, 0.34)	0.01 (-0.02, 0.04)	0.72 (-10.15, 11.59)
Previously: Voluntary Nonprofit			
Currently: Governmental	0.12 (-0.23, 0.46)	-0.002 (-0.02, 0.02)	-4.67 (-11.25, 1.92)
Currently: Proprietary	0.16 (-0.07, 0.40)	0.01 (-0.004, 0.02)	-1.08 (-5.29, 3.13)

* $p < 0.05$; ** $p < 0.01$. † Inverse outcome, meaning a negative coefficient indicates better performance. Coeff.=Coefficient; CI=Confidence Interval See Analysis Methodology for additional details on OLS specifications.

Table 2: Changing from **Proprietary to Voluntary Nonprofit** owner type was associated with **better HAC but worse Hospital VBP performance**, while changing from **Proprietary to Governmental** was associated with **worse Hospital VBP performance**. Changing from **Governmental to Voluntary Nonprofit** was associated with **better HRRP performance**.

POLICY IMPLICATIONS

Increases since FY2022 PDY in adverse outcomes tracked by the Hospital VBP and HACRP programs pose challenges to CMS's three-part aim to support better care for individuals, better health for populations, and lower cost. These trends likely reflect the impact of the COVID-19 Public Health Emergency (PHE) and related CMS policies such as the exclusion of 2020Q1/Q2 data, and measure specification changes made in responses to the PHE. A detailed summary of these policies and performance periods is available upon request.

Robust DiD methods found that **introduction of HRRP did not cause eligible hospitals to achieve greater reductions in readmissions than HRRP ineligible hospitals**. Future work will examine whether these same results apply to other outcomes, such as mortality.

Shifts within the hospital market environment may affect quality of care. Our findings suggest **changes in hospital ownership are associated with differences in performance**. However, the direction and magnitude depends on the specific type of owner change and the outcome examined. Future work could examine more granular owner type changes, such as private equity acquisitions.