

An Early Look at Performance on the Emergency Care Measures Included in Medicare's Hospital Inpatient Value-Based Purchasing Program

Megan McHugh, PhD; Jennifer Neimeyer, PhD; Emilie Powell, MD, MS; Rahul K. Khare, MD, MS; James G. Adams, MD

Study objective: Medicare's new, mandatory Hospital Inpatient Value-Based Purchasing Program introduces financial rewards or penalties to hospitals according to achievement or improvement on several publicly reported quality measures. Our objective was to describe hospital reporting on the 4 emergency department (ED)-related program measures, variation in performance on the ED measures across hospital characteristics, and the characteristics of hospitals that were more likely to receive performance scores based on improvement versus achievement.

Methods: This was an exploratory, descriptive analysis. We merged 2008 to 2010 performance data from Hospital Compare with the 2009 American Hospital Association Annual Survey. We calculated a composite score for the 4 ED measures and used Kruskal-Wallis tests to examine differences in performance across hospital characteristics. We also examined differences in the percentage of scores that were awarded according to improvement versus achievement.

Results: There were 2,927 hospitals that qualified for the value-based purchasing program and were included in the analysis. For-profit hospitals received the highest scores; public hospitals and hospitals lacking The Joint Commission (TJC) accreditation received the lowest scores. Public hospitals had the largest share of scores awarded according to improvement (39.8%); for-profit hospitals had the lowest (27.8%).

Conclusion: We found variation in performance by hospital characteristics on the ED-related program measures. Although public and non-TJC-accredited hospitals trailed in performance, they showed strong signs of improvement, signaling that performance gaps by ownership and accreditation may decrease. Considering the increasing scope of the value-based purchasing program, ED leaders should monitor both achievement and improvement on the 4 ED-related program measures. [Ann Emerg Med. 2013;61:616-623.]

Please see page 617 for the Editor's Capsule Summary of this article.

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INTRODUCTION

Background

Beginning October 1, 2012, 1% of hospital Medicare payments (approximately \$850 million) have been withheld then redistributed according to hospitals' performance on selected quality measures.¹ Specifically, hospitals will receive money if their performance is better than the national median on 12 process measures and 8 patient satisfaction measures or if they show considerable improvement on the measures from the previous year (Table 1). This initiative, the Hospital Inpatient Value-Based Purchasing Program, represents a key step in the Centers for Medicare & Medicaid Services' (CMS') effort to shift payment toward quality rather than volume. It is also the first national, mandatory effort to establish rewards and penalties for hospitals according to their performance.

Through this program, CMS is changing the way that it pays hospitals. The goal is to reward hospitals that show the best or most improved clinical practices and patient experiences. The program was established by the Patient Protection and Affordable Care Act and builds on legislation from 2003 and 2005, which established the means for CMS to pay hospitals according to their reported quality measures.² Hospitals will begin to receive payments under the value-based purchasing program after October 1, 2012, and the size of the program (in terms of dollars and number of performance measures) will increase over time.

Importance

Emergency department (ED) performance factors heavily in the scoring methodology that will be used to calculate hospital incentive payments and penalties under the value-based

Editor's Capsule Summary

What is already known on this topic

Medicare's Hospital Inpatient Value-Based Purchasing Program seeks to improve the quality of patient care by linking a portion of a hospital's payment to performance on quality measures. In an effort to reward improvement, as well as achievement, the value-based purchasing program's formula for calculating a quality score considers both a hospital's current performance and the hospital's improvement from the previous year.

What question this study addressed

This study describes the performance of hospitals reporting data on the 4 emergency department (ED)-related quality measures and assesses the association between hospital characteristics and a composite score of all ED measures reported.

What this study adds to our knowledge

Analyzing data from 2,927 hospitals reporting data for 2008 to 2010, the authors found that for-profit hospitals had higher composite scores than public hospitals. Public hospitals had a higher proportion of their program scores based on improvement than for-profit hospitals.

How this is relevant to clinical practice

The results of this study are not expected to change clinical practice.

purchasing program. Of the 12 process measures currently included in the program, 4 are directly relevant to care delivered in the ED: fibrinolytic therapy received within 30 minutes of hospital arrival (acute myocardial infarction-7a), primary percutaneous coronary intervention received within 90 minutes of hospital arrival (acute myocardial infarction-8a), blood culture testing performed in the ED before initial antibiotic received in the hospital (pneumonia-3b), and initial antibiotic selection for community-acquired pneumonia in immunocompetent patients (pneumonia-6).^{1,3} Although the emergency medicine community has focused efforts on other payment reform initiatives, many of which include these 4 measures,^{4,5} the Hospital Inpatient Value-Based Purchasing Program has received less attention. Yet emergency physicians may soon experience heightened pressure from their hospital administrators to achieve high performance or improvement on the 4 ED-related measures, as well as future measures.

Goals of This Investigation

Our main purpose is to introduce the emergency medicine community to the new value-based purchasing program, which

will have an increasing influence on hospital reimbursement. We describe hospital reporting on the 4 ED-related program measures, variation in performance across hospital characteristics, and the characteristics of hospitals that are more likely to receive performance scores according to improvement versus achievement. Although several previous studies have investigated hospital performance on ED-related quality measures,^{6,7} this effort is unique in its focus on ED measures included in the new value-based purchasing program, its evaluation of performance according to achievement or improvement, and its use of national data. Previous research has shown higher performance on clinical process measures at teaching hospitals, not-for-profit hospitals, and hospitals in the Northeast and Midwest.^{8,9} Therefore, we hypothesize that performance on the ED measures will be higher at those facilities. Investigating variation in performance is important to understanding the types of hospitals that are likely to perform well under the program and where future improvement efforts may be best directed. Additionally, this analysis represents a first look at ED performance scores under the value-based purchasing program and can be used as a baseline for tracking performance over time.

MATERIALS AND METHODS

Study Design, Selection of Participants, and Data Collection and Processing

This is an exploratory, descriptive analysis of secondary data. We obtained 2008 to 2010 performance data for the 4 ED-related clinical process measures included in the value-based purchasing program from the CMS Web site Hospital Compare (<http://www.hospitalcompare.hhs.gov/>). The "Download Database" link on the Web site permits users to download hospital identifiers, performance scores for each of the measures, and sample sizes directly to a statistical software package. The process-of-care measures are chart-abstracted measures that assess hospitals' compliance on evidenced-based processes related to acute myocardial infarction and pneumonia. The measures included in the value-based purchasing program are measures that CMS previously adopted as part of the Hospital Inpatient Quality Reporting program.¹⁰ Although public reporting of data under the program is voluntary, only hospitals that report their performance data are eligible for a full Medicare payment update. As a result, 97% of hospitals satisfactorily met the reporting requirements in 2010.¹¹ No additional data collection is conducted for the value-based purchasing program.

We linked these data to the 2009 American Hospital Association Annual Survey, which contains information on hospital characteristics including size (<100 beds=small, 100–299 beds=medium, 300 or more beds=large), ownership (public, not for profit, for profit), teaching status (defined as having affiliation with a medical school or membership with the Council of Teaching Hospitals), region, The Joint Commission (TJC) accreditation, and proportion of patient days paid for by Medicare (less than 25%, 25% to 49%, 50% to 74%, or 75%

Table 1. Measures included in the Hospital Inpatient Value-Based Purchasing Program, FY 2013.

Clinical Process Measures	Patient Satisfaction Measures
AMI-7a Fibrinolytic therapy received within 30 min of hospital arrival*	Nurses "always" communicated well
AMI-8a Primary PCI received within 90 min of hospital arrival*	Physicians "always" communicated well
PN_3b Blood cultures performed in the ED before initial antibiotic received in hospital*	Patients "always" received help as soon as they wanted
PN_6 Initial antibiotic selection for community-acquired pneumonia in immunocompetent patient*	Pain was "always" well controlled
HF_1 Discharge instructions	Staff "always" explained
SCIP_INF_1 Prophylactic antibiotic received within 1 h before surgical incision	Room was "always" clean and was "always" quiet at night ²
SCIP_INF_2 Prophylactic antibiotic selection for surgical patients	Yes, staff "did" give patients discharge information
SCIP_INF_3 Prophylactic antibiotics discontinued within 24 h after surgery ends	Patients who gave a rating of 9 or 10 (high)
SCIP_INF_4 Cardiac surgery patients with controlled 6 AM postoperative serum glucose level	
SCIP_CARD_2 Surgery patients receiving a β -blocker before arrival who received one during the postoperative period	
SCIP_VTE-1 Surgery patients with recommended venous thromboembolism prophylaxis ordered	
SCIP-VTE-2 Surgery patients who received appropriate venous thromboembolism prophylaxis within 24 h before surgery to 24 h after surgery	

FY, Fiscal year; AMI, acute myocardial infarction; PCI, percutaneous coronary intervention; PN, pneumonia; HF, heart failure; SCIP, surgical care improvement project; INF, infection; CARD, cardiovascular; VTE, venous thromboembolism.

*ED-related measures.

Source: *Federal Register*. 2011;76:26490-26547.

Note: Additional information on measure specifications can be found in the measure specifications manual on CMS' QualityNet Web site: <http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228771525863>.

or more). We selected these characteristics because they have been shown to be associated with hospital quality.^{8,12,13}

We limited the analysis to hospitals that met the criteria for the Medicare value-based purchasing program. Hospitals must be acute care hospitals paid under the Inpatient Prospective Payment System. An exception was made for acute care hospitals in Maryland, which are not paid under that system but are included in the program. Additionally, between 2009 and 2010, hospitals must have reported data from at least 100 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys and data for at least 4 of the 12 clinical process measures included in the program, with at least 10 eligible cases.¹

We calculated scores for each of the 4 ED performance measures according to the method used by CMS for the value-based purchasing program, the details of which are described in the program's Final Rule.¹ In brief, for each performance measure, hospitals receive an achievement score between 1 and 10 according to how much their current performance score exceeds the median for all hospitals. If the score is below the median, the hospital receives an achievement score of zero. If the score is at or above the mean score of the top decile of hospitals, the hospital receives an achievement score of 10. Additionally, hospitals also receive an improvement score between 1 and 10 according to how much the score on the performance measure improved from the previous year (ie, baseline). If performance did not improve, the hospital receives an improvement score of zero. The final performance measure score is the higher of the achievement or improvement score. Examples of the calculation of performance measure scores are

presented in Appendix E1 (available online at <http://www.annemergmed.com>).

Hospitals that did not report at least 10 cases for a particular clinical process measure (ie, low-volume hospitals or hospitals not offering the service) were not eligible to receive a score for that measure. In an effort to ensure accuracy, 2 investigators (M.M. and J.N.) independently calculated scores for each hospital and arrived at the same scores.

One of the challenges associated with the program's scoring methodology is that performance measure scores do not easily translate into dollar value rewards or penalties. The more program points a hospital earns, the more likely it will recoup the value of the 1% Medicare payment withholding. Hospitals with the highest scores will receive total payments in excess of the withheld amount (ie, they will receive bonuses under the program); hospitals with the lowest scores will not recoup the withheld amount (ie, they will face penalties under the program).

In administering the value-based purchasing program, CMS calculates a composite score for all clinical process measures included in the program. We applied CMS' composite score methodology to the 4 ED measures to create an ED composite score, which is not defined in the legislation. For each hospital, we summed total points earned for the ED performance measures and divided by the total number of points for which the hospital was eligible. Eligible points are equal to 10 (the highest possible score on a performance measure) times the number of ED performance measures for which the hospital reported at least 10 cases. We then multiplied by 100. ED composite scores range from 0 to 100.

There are 2 important differences between CMS' methodology and our approach. First, CMS uses a 9-month performance period for the current and baseline periods. However, because of the way data are reported in Hospital Compare, we used 12-month periods. October 2008 to September 2009 represented our baseline period, and October 2009 to September 2010 was our current period. These were the most recent data available from Hospital Compare during our analysis. Second, CMS uses a minimum of 4 clinical process measures to calculate program composite scores. Because there are only 4 ED-related performance measures, we did not set a minimum for the calculation of the ED composite scores.

Primary Data Analysis

We tested the individual and ED composite scores for normality with the skewness/kurtosis test, and the hypothesis of normality was rejected. These results are not surprising, considering CMS' scoring methodology, which awards zero achievement points to hospitals that do not meet the median score and zero improvement points for hospitals that do not improve. Zero is the most common score for the individual performance measures and the ED composite score.

We display medians and interquartile ranges (IQRs) in our results. Individual ED performance scores across hospital characteristics are displayed graphically. Additionally, we used Kruskal-Wallis tests to compare ED composite scores across hospital characteristics. Because of the large sample size and number of comparisons, we used a more conservative *P* value (.008) for significance testing with the Bonferroni correction.¹⁴

Across all hospitals, we also calculated the percentage of all ED-related performance measure scores that were derived according to improvement rather than achievement. We took a conservative approach to identifying scores based on improvement. If both improvement and achievement scores were equal, we considered the score to be derived according to achievement.

Approximately 9% of hospitals included in the analysis were non-TJC-accredited hospitals, and we found that scores for those hospitals were significantly different than for others. Therefore, we repeated the analysis with only TJC-accredited hospitals to investigate whether nonaccredited hospitals accounted for much of the poor performance across other types of hospitals (eg, small hospitals). Analyses were performed with Stata (version 10.0; StataCorp, College Station, TX). Our institutional review board determined that approval was not required because the study did not involve human subjects.

RESULTS

There were 3,030 hospitals that met the criteria for the value-based purchasing program. One hundred three low-volume hospitals were dropped from the analysis because they reported fewer than 10 cases for every ED measure. The final sample included 2,927 hospitals. Compared with all general medical and surgical hospitals in the United States, the hospitals in the analysis included fewer small hospitals.

Only 28 of the 2,927 hospitals were eligible to receive a score for the fibrinolytic therapy measure (ie, only 28 reported at least 10 eligible cases for the measure) compared with 1,394 for primary percutaneous coronary intervention within 90 minutes, 2,902 for blood cultures performed before initial antibiotic, and 2,919 for the initial antibiotic selection. Of the 2,927 hospitals, 28 received a score on only 1 measure, 1,487 received a score on 2 measures, 1,407 received a score on 3 measures, and only 5 hospitals received a score on all 4 measures.

Main Results

The Figure shows the distribution of scores on the individual measures across different types of hospitals. Hospitals earned a median program score of 3 on fibrinolytic therapy within 30 minutes (acute myocardial infarction-7a) and initial antibiotic selection (pneumonia-6) and a median score of 4 on primary percutaneous coronary intervention within 90 minutes (acute myocardial infarction-8a) and blood cultures performed before initial antibiotic (pneumonia-3b).

Table 2 shows median ED composite scores across different types of hospitals. There were significant differences in ED composite scores according to ownership ($P<.001$), region, ($P<.001$), and TJC accreditation ($P<.001$). The highest-performing hospitals were private for-profit hospitals (composite ED performance score of 50; IQR=25 to 73). The lowest-performing hospitals were those that were not accredited by the TJC (composite ED performance score of 27; IQR=10 to 45).

Table 2 also shows the percentage of total ED performance scores that were awarded based on improvement rather than achievement. Differences were significant across all categories of hospitals. Public hospitals had the highest percentage of scores based on improvement (39.8%); for-profit hospitals had the lowest (27.8%). Though the data are not displayed, we found similar results when we limited the analysis to only TJC-accredited hospitals.

LIMITATIONS

First, as noted above, we used a 12-month rather than a 9-month period of performance. Doing so likely resulted in the inclusion of certain small hospitals that would not have met the reporting criteria for the value-based purchasing program had we used a 9-month reporting period.

Second, we examined data for only a single program year (which includes a baseline and current year of data), using the most recent data available at our analysis. We cannot determine the consistency of these results had a different program year been selected.

Third, although our approach of having 2 investigators independently calculate performance measure scores should increase the reliability of the scores, there is always the possibility of calculation errors.

Fourth, because few hospitals received performance scores for all 4 ED performance measures, the ED composite score was disproportionately driven by performance on the pneumonia measures.

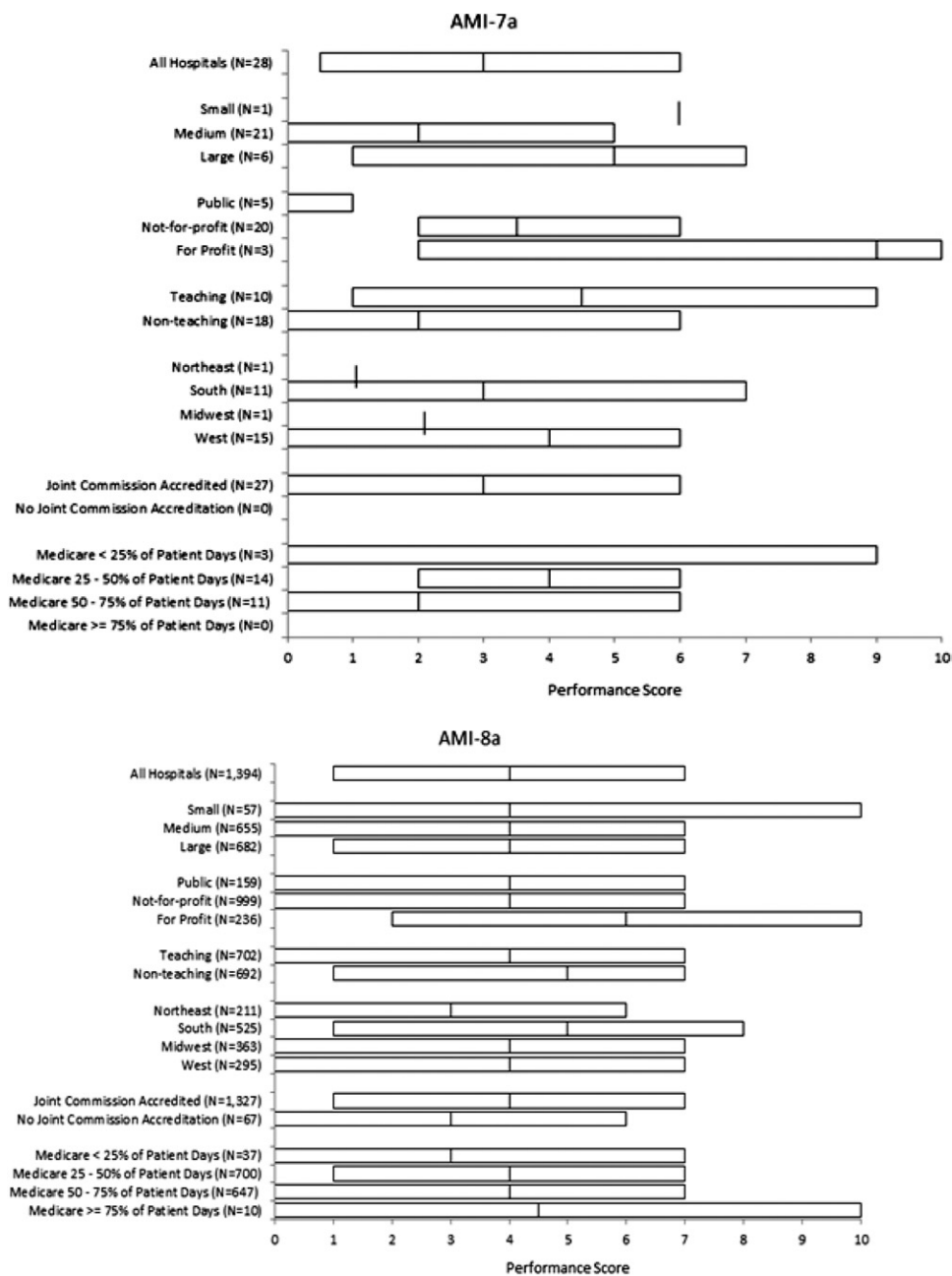


Figure. Median, 25th percentile, and 75th percentile scores by measure and hospital characteristics. A single line indicates that the median and 25th and 75th percentiles were all equal.

Fifth, the 4 measures included in this analysis were selected because of their relevance to care provided in the ED.³ However, performance scores may also reflect care provided outside the ED. For example, initial antibiotic selection (pneumonia-6) may be performed in an inpatient unit, and primary percutaneous coronary intervention within 90 minutes represents care delivered by both the ED and cardiology. Using the Hospital Compare data, we had no way to limit our analysis to patients who received care only in the ED. Furthermore, performance on the 4 ED measures may be influenced by

factors outside of the ED; for example, the emergency medical services system within the community, hospital location and resources, and limited bed capacity leading to ED boarding. Similarly, ED-related factors may influence performance on other program measures that were not included in this analysis.

DISCUSSION

Our article provides a first look at the ED-related measures included in Medicare's new, mandatory Hospital Inpatient

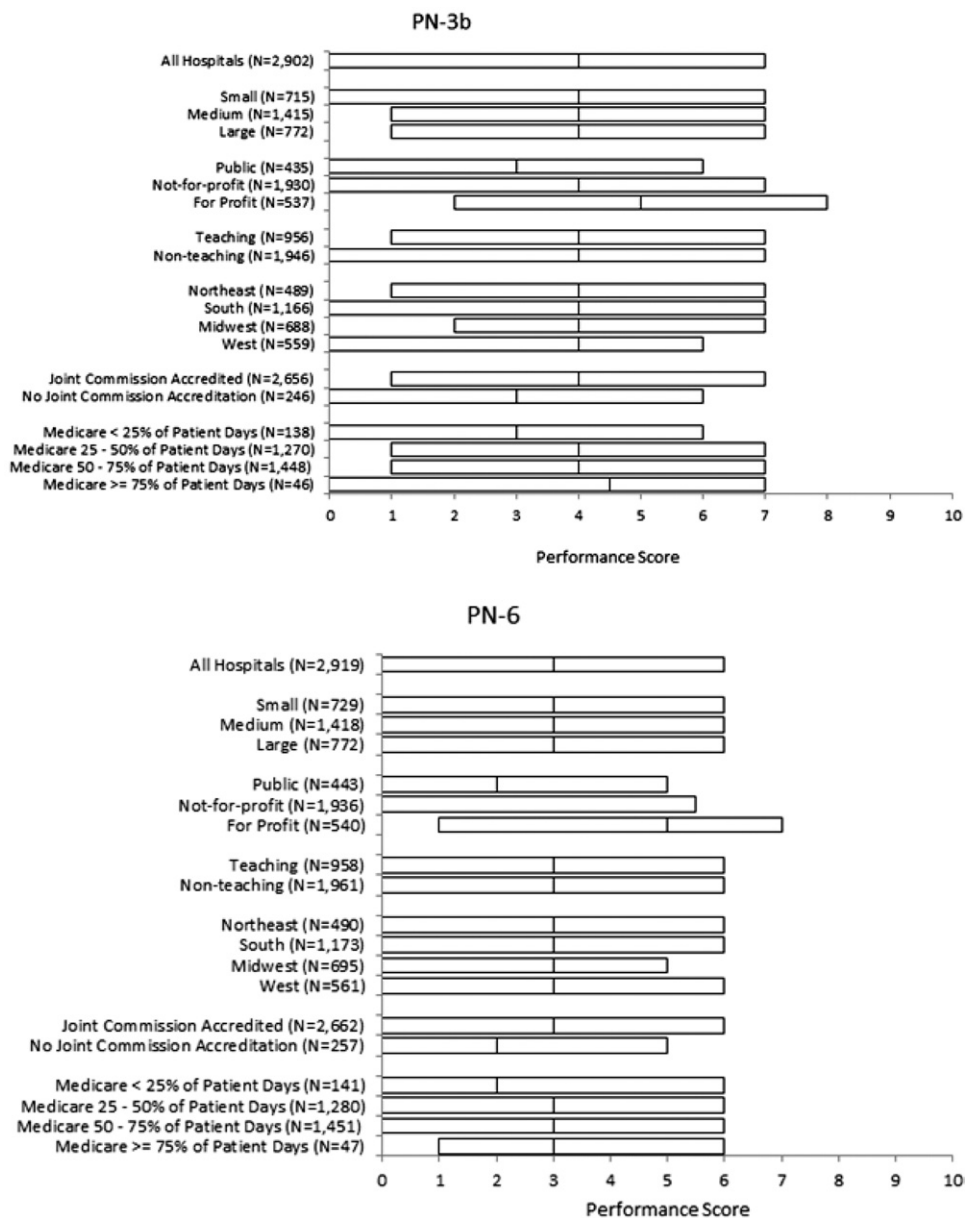


Figure. Continued

Value-Based Purchasing Program, which will affect the majority of hospitals in the United States. Our findings show that most hospitals do not meet the reporting thresholds for 2 of the ED-related program measures. As a result, for most hospitals, final value-based purchasing program performance scores will include the ED-related pneumonia measures but not the acute myocardial infarction measures. Furthermore, a small number (103) of very low-volume hospitals may not have any ED measures included in the program.

Our article is among the first to consider hospital performance according to achievement or improvement, following the approach adopted by CMS for the Hospital Inpatient Value-Based Purchasing Program.

Overall, we found that a minority (33.7%) of performance scores were awarded according to improvement. In our sample, public hospitals, large hospitals, and nonaccredited hospitals were the largest beneficiaries of the policy to consider improvement, as well as achievement. It is encouraging that non-TJC-accredited and public hospitals, which had the lowest achievement scores, at least received points for improvement, suggesting that the performance gap by ownership and accreditation could potentially decrease. Although performance scores for small hospitals were not statistically different from those of larger hospitals, they could fall behind those of larger hospitals if they struggle to improve. These are issues that warrant monitoring.

Table 2. ED composite scores and percentage of individual scores according to improvement, by hospital characteristic.

Hospital Characteristic	Median Composite ED Performance Score* (IQR)	P Value	Percentage of Performance Scores According to Improvement	P Value
All hospitals (N=2,927)	35 (20–55)		33.7	
Small hospitals (734)	35 (15–55)	0.67	31.3	<.001
Medium hospitals (1,421)	37 (20–55)		33.6	
Large hospitals (772)	37 (23–55)		36.3	
Nonfederal, public (443)	30 (15–50)	<.001	39.8	<.002
Private not-for-profit (1,937)	35 (20–53)		34.0	
Private for-profit (547)	50 (25–73)		27.8	
Teaching (959)	37 (20–53)	0.53	36.3	<.001
Nonteaching (1,968)	35 (20–57)		32.5	
Northeast (490)	35 (20–50)	<.001	34.2	<.001
South (1,177)	37 (20–60)		33.9	
Midwest (698)	37 (23–55)		32.0	
West (562)	35 (20–50)		35.0	
TJC accreditation (2,669)	37 (20–57)	<.001	33.5	<.001
No TJC accreditation (258)	27 (10–45)		36.0	
Medicare <25% of patient-days (141)	30 (13–55)	0.16	32.4	<.001
Medicare 25%–49% of patient-days (1,282)	37 (20–55)		34.5	
Medicare 50%–74% of patient days (1,457)	37 (20–55)		33.3	
Medicare ≥75% of patient days (47)	35 (15–65)		31.6	

*Range=0 to 100.

The incentive structure of the value-based purchasing program was a subject of considerable debate.¹⁵ Rewarding for improvement has the advantage of engaging lower-performing hospitals because the targets may seem more attainable than reaching an achievement threshold. Also, paying on the basis of improvement encourages hospitals to continuously improve, not just achieve a set threshold. However, rewarding for improvement may also be perceived as unfair to some if low-performing hospitals that improve a certain amount are rewarded more than hospitals that consistently achieve higher performance. Further, because hospitals earn achievement points for performing better than the national median, hospitals may be less inclined to cooperate and share best practices.

If CMS and other payers continue to reward hospitals according to achievement or improvement, researchers should consider adopting a similar approach for studies that investigate hospital performance. Additionally, hospital and department administrators should recognize that improvement is valued to a similar degree by CMS; they need to recognize the importance of improvement and that a hospital's lowest-performing quality measure may represent its best opportunity for gains under the program's method for calculating performance scores. We recommend that hospital and ED leaders request internal quality reports that include longitudinal data so that improvement can be monitored along with achievement.

CMS was statutorily required to select measures for the value-based purchasing program that are included in the Hospital Inpatient Quality Reporting program, publicly available on Hospital Compare for at least 1 year, and measures have been set forth by 1 or more national consensus-building entities, such as the National Quality Forum.¹ Beginning in

fiscal year (FY) 2014, CMS will add several measures to the program, including mortality measures, patient safety indicators from the Agency for Healthcare Research and Quality, and hospital-acquired conditions measures. Furthermore, the percentage of Medicare reimbursement that will be withheld from hospitals to fund the value-based purchasing program (ie, the amount of funding “at risk” for hospitals) will slowly but gradually increase from 1% in FY 2013 to 2% in FY 2017. Future research should continue to monitor hospitals' progress on the measures included in the program and should also consider whether the incentive structure of the value-based purchasing program contributed to better clinical performance and improved outcomes.

In summary, our data show variation in performance by hospital characteristics on the ED-related measures included in Medicare's new value-based purchasing program. The biggest difference in performance scores was between for-profit and public hospitals. Although public hospitals trailed in performance, they had a relatively large share of scores based on improvement, signaling that the performance gap by ownership could potentially decrease. Considering the wide reach and increasing scope of the value-based purchasing program, ED leaders should monitor both achievement and improvement on the 4 ED-related measures included in the program.

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Author affiliations: From the Center for Healthcare Studies (McHugh, Neimeyer, Powell, Khare), Department of Emergency Medicine (McHugh, Powell, Khare, Adams), and Program in Healthcare Policy and Implementation (McHugh), Northwestern University, Feinberg School of Medicine, Chicago, IL.

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Address for correspondence: Megan McHugh, PhD, E-mail megan-mchugh@northwestern.edu.

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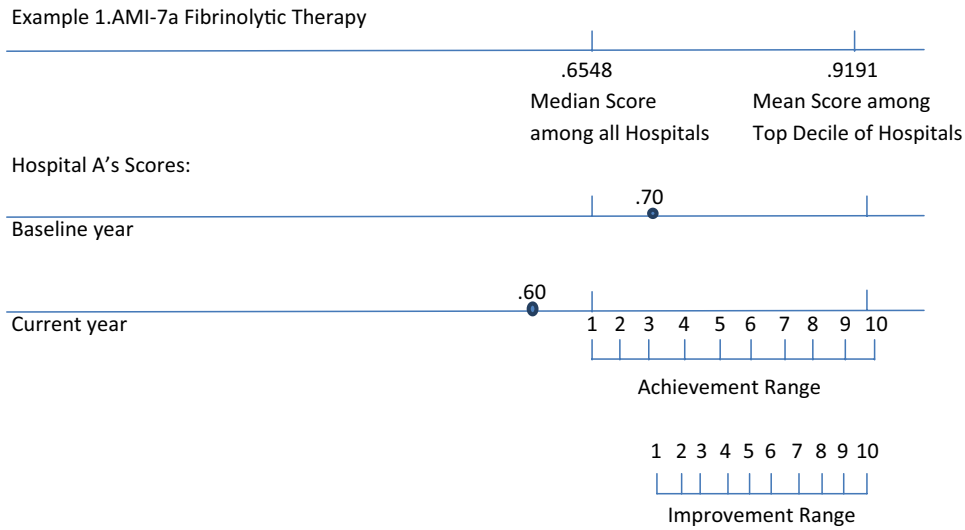
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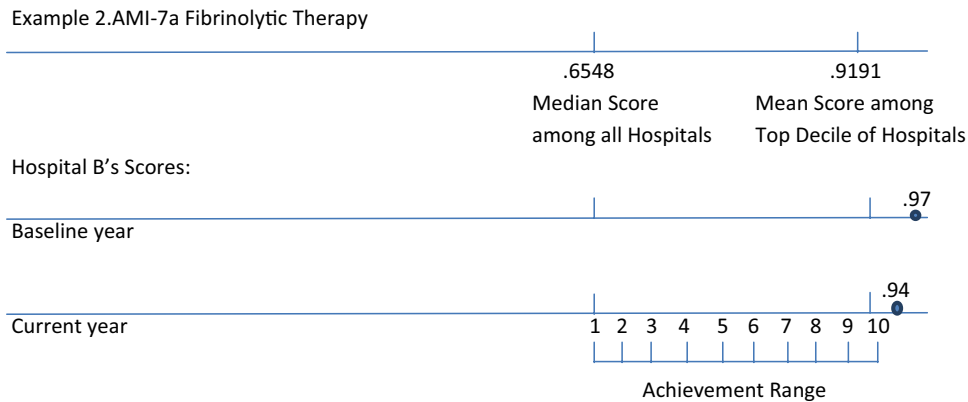
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APPENDIX E1.

Examples of the calculation of performance scores.

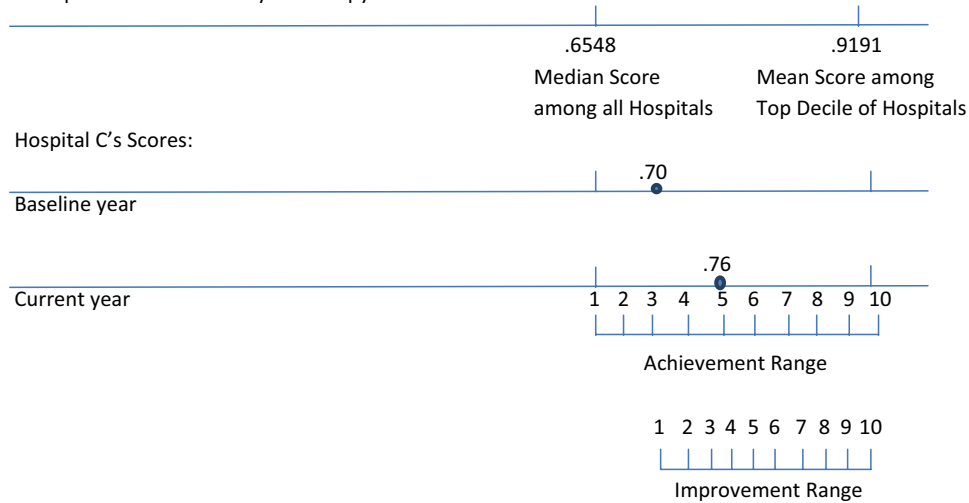


In this example, Hospital A's performance on AMI-7a in the current year (.60) is below the median score for all hospitals (.6548), so it receives 0 points for achievement. Also, Hospital A receives 0 points for improvement because its performance during the current period is lower than its performance during the baseline period. Hospital A's performance score on this measure is 0.



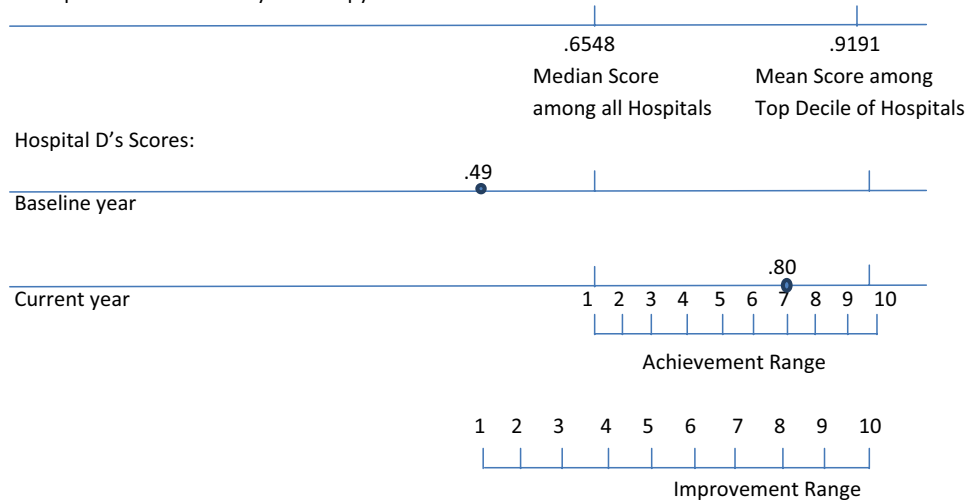
Hospital B's performance on AMI-7a in the current year (.94) exceeds the mean score among the top decile of hospitals, so hospital B earns 10 points for achievement. Hospital B earns 0 points for improvement because its current year's score is lower than the baseline year's score. Hospital B's performance score on this measure is 10.

Example 3.AMI-7a Fibrinolytic Therapy



In this example, Hospital C’s performance on AMI-7a in the current year (.76) is above the median score for all hospitals (.6548), so it receives 5 points for achievement. Hospital C earns 4 points for improvement because its performance during the current period is greater than its performance during the baseline period. Because the higher of the two scores is used for determining the measure score, Hospital C’s performance score is 5.

Example 4.AMI-7a Fibrinolytic Therapy



In this example, Hospital D’s performance on AMI-7a in the current year (.80) is above the median score for all hospitals (.6548), so it receives 7 points for achievement. Hospital D earns 8 points for improvement because its performance during the current period is greater than its performance during the baseline period. Because the higher of the two scores is used for determining the measure score, Hospital D’s performance score is 8.