



Comparison of Hospital Door-to-Balloon Times Reported by CMS-HQA and the ACC-National Cardiovascular Data Registry: Apples and Oranges?

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Abstract

PLEASE NOTE: The abstract as submitted for the proceedings of this meeting and replicated in the abstract below are not in complete agreement due to minor changes in the final cohort analyzed.

Background: Hospital performance on door-to-balloon (DTB) time in primary percutaneous coronary intervention (PCI) is now collected and reported by multiple organizations, although the reliability of this measurement across different data sources is unknown.

Objective: To compare DTB times reported to the Health Quality Alliance (HQA) and the National Cardiovascular Data Registry (NCDR)

Methods: We compared hospital DTB times between HQA and NCDR in 241 hospitals during 2005. We compared hospital rankings from each data source based on mean DTB time, median DTB, proportion of patients with DTB times within 90 minutes, and proportion of patients with DTB times within 120 minutes. We determined the proportion of hospitals that remained within similar quintiles of rankings in both data sources and evaluated agreement using kappa coefficients.

Results: Overall, agreement between HQA and NCDR hospital rankings was only fair to moderate (kappa coefficients ranging from 0.32 to 0.56 depending on DTB specification), with poorest agreement in HQA-NCDR rankings based on the proportion of patients with DTB within 90 minutes. Even in the best case, only 48% of hospitals were in the same quintile of hospital rankings for HQA and NCDR.

Conclusions: Agreement between hospital rankings based on DTB times for HQA and NCDR varied for different specifications of DTB time, but was no better than fair to moderate. This suggests the need for better consensus regarding measurement and reporting of DTB time.

Introduction

Data on hospital performance in door-to-balloon (DTB) times for patients with ST elevation myocardial infarction (STEMI) are now collected and reported as part of several national and regional quality improvement efforts.

Despite the rapid proliferation of these efforts to measure DTB time, its consistency across different data sources has not been previously examined, which may have implications for public reporting and pay-for-performance programs that utilize this metric.

The purposes of this investigation were:

- To compare performance rankings for hospitals based on DTB time as assessed by 2 prominent, national data sources: a) the *Hospital Quality Alliance* (HQA) – a consortium of organizations including CMS and JCAHO – and b) the *National Cardiovascular Data Registry's* (NCDR) *CathPCI Registry*TM.
- To determine whether the level of agreement between HQA and NCDR varies based on the particular specification of DTB time used (e.g., hospital mean vs. hospital median DTB time).

Methods

Study Population and Data Elements

Data collected from HQA and NCDR in 2005 were used for this analysis. HQA contains data from 1407 U.S. hospitals with DTB time assessed as the time from hospital arrival to balloon inflation in patients with STEMI or new LBBB on the ECG performed closest to hospital arrival. NCDR contains data from 456 U.S. hospitals with DTB time assessed using slightly different criteria than those described above for HQA. Specifically, it was measured as the time from hospital arrival to the first attempt at "reperfusion" with an intracoronary device in patients with STEMI or new LBBB.

Data on patients who were transferred in from another hospital, received fibrinolytic therapy or developed STEMI after hospitalization were *not* included. We also excluded hospitals with <20 patients (n=118 in NCDR, n=338 in HQA) and those not reporting throughout the entire year (n=62 in NCDR, n=19 in HQA). 241 hospitals in the 2 data sources were directly matched using unique identifiers.

Data Analysis

We ranked hospitals into quintiles of performance separately in HQA and NCDR data using 4 specifications of DTB time reflecting the various ways in which hospital performance for this measure has been reported:

- 1) mean DTB time, 2) median DTB time, 3) proportion of patients with DTB times ≤90 minutes, and 4) proportion of patients with DTB times ≤120 minutes.

We compared hospital rankings based on HQA and NCDR for each DTB time specification (i.e., mean, median, proportion ≤90 or ≤120 mins). We calculated weighted kappa coefficients for each comparison and also reported the proportion of hospitals that remained within the same quintile or a similar quintile (i.e., the same or nearest quintile above or below) between the 2 data sources. Using the framework of the Medicare Premier Demonstration Project, we also determined the total number of hospitals that would have had the same payment adjustments if DTB time in HQA or NCDR was used (based on rewards and withholding for the top and bottom quintiles of hospital rankings). SAS version 9.1 and Stata version 8.0 were used for these analyses.

Results

- Table 1** displays facility characteristics for the 241 matched hospitals. There were 51 (± 23) patients per hospital in HQA and 58 (± 28) patients per hospital in NCDR.
- Agreement between HQA and NCDR hospital rankings was fair to moderate overall with kappas ranging from 0.32 to 0.56 depending on the DTB specification (**Table 2**). Poorest agreement was for mean DTB time and greatest agreement was for the proportion of patients with DTB within 90 minutes.
- For median DTB time, 56 (58%) of 97 hospitals in the top and bottom quintiles of hospital rankings for HQA overlapped with NCDR (**Table 3**). For the proportion of patients with DTB times within 90 minutes, 58 (60%) of 96 hospitals in the top and bottom quintiles of hospital rankings for HQA overlapped with NCDR (**Table 4**). These findings suggest that ~40% of hospitals would have altered payments under current pay-for-performance frameworks based on the particular data source utilized.

Table 1. Characteristics of 241 matched hospitals.

	No. of hospitals	%
Geographic region		
Northeast	24	9.96
South	76	31.54
Midwest	88	36.51
West	53	21.99
Location		
Urban	130	53.94
Rural	40	16.60
Suburban or other	71	29.46
Teaching status		
Yes	147	61.00
Mean no. of beds	414.26	191.47
Mean no. of annual PCIs	931.64	740.16

Table 2. Comparability of hospital rankings between HQA & NCDR

	Mean DTB time No. (%)	Median DTB time No. (%)	DTB time within 90 mins No. (%)	DTB time within 120 mins No. (%)
All hospitals				
Same quintile	86 35.7	113 46.9	115 47.7	116 48.1
Similar quintile*	169 70.1	216 89.6	210 87.1	203 84.2
Kappa coefficient	0.32	0.55	0.56	0.53
Hospitals in top quintile in NCDR				
Same quintile in HQA	23 47.9	29 60.4	27 56.3	30 62.5
Similar quintile* in HQA	30 62.5	38 79.2	42 87.5	41 85.4
Hospitals in bottom quintile in NCDR				
Same quintile in HQA	21 43.8	27 54.0	31 64.6	29 60.4
Similar quintile* in HQA	32 66.7	47 94.0	40 83.3	35 72.9

*Defined as same or nearest quintile

Table 3. Comparison between HQA and NCDR data across quintile rankings for median DTB time.

Quintiles based on NCDR data†	Quintiles based on HQA data*			Total No.
	Top Quintile No. of hospitals	2 nd -4 th Quintiles No. of hospitals	Bottom Quintile No. of hospitals	
Top quintile	29	13	6	48
2 nd -4 th quintiles	20	108	15	143
Bottom quintile	0	23	27	50
Total	49	144	48	241

Table 4. Comparison between HQA and NCDR data across quintile rankings for proportion with DTB time <90 minutes.

Quintiles based on NCDR data†	Quintiles based on HQA data*			Total No.
	Top Quintile No. of hospitals	2 nd -4 th Quintiles No. of hospitals	Bottom Quintile No. of hospitals	
Top quintile	31	15	2	48
2 nd -4 th quintiles	17	109	19	145
Bottom quintile	0	21	27	48
Total	48	145	48	241

Conclusions and Policy Implications

- We found only fair to moderate agreement between DTB times reported to HQA and NCDR by the same group of hospitals. This led to large differences in hospital rankings based on the 2 data sources.
- Potential explanations for these differences in DTB times between HQA and NCDR include: 1) different criteria in cohort selection for the measurements, 2) variations in assessment of DTB time, and 3) alternative methods for data auditing and quality checks.
- Differences in assessing DTB times between HQA and NCDR substantially impacts on hospital rankings for individual facilities. For example, direct payments to ~40% of the hospitals we examined would have been altered based on the particular data source used under the current pay-for-performance framework of the Medicare Premier Demonstration Project.
- Better consensus on measurement and reporting of DTB time is needed, particularly as the measure is incorporated into quality improvement efforts based on public reporting and pay-for-performance.