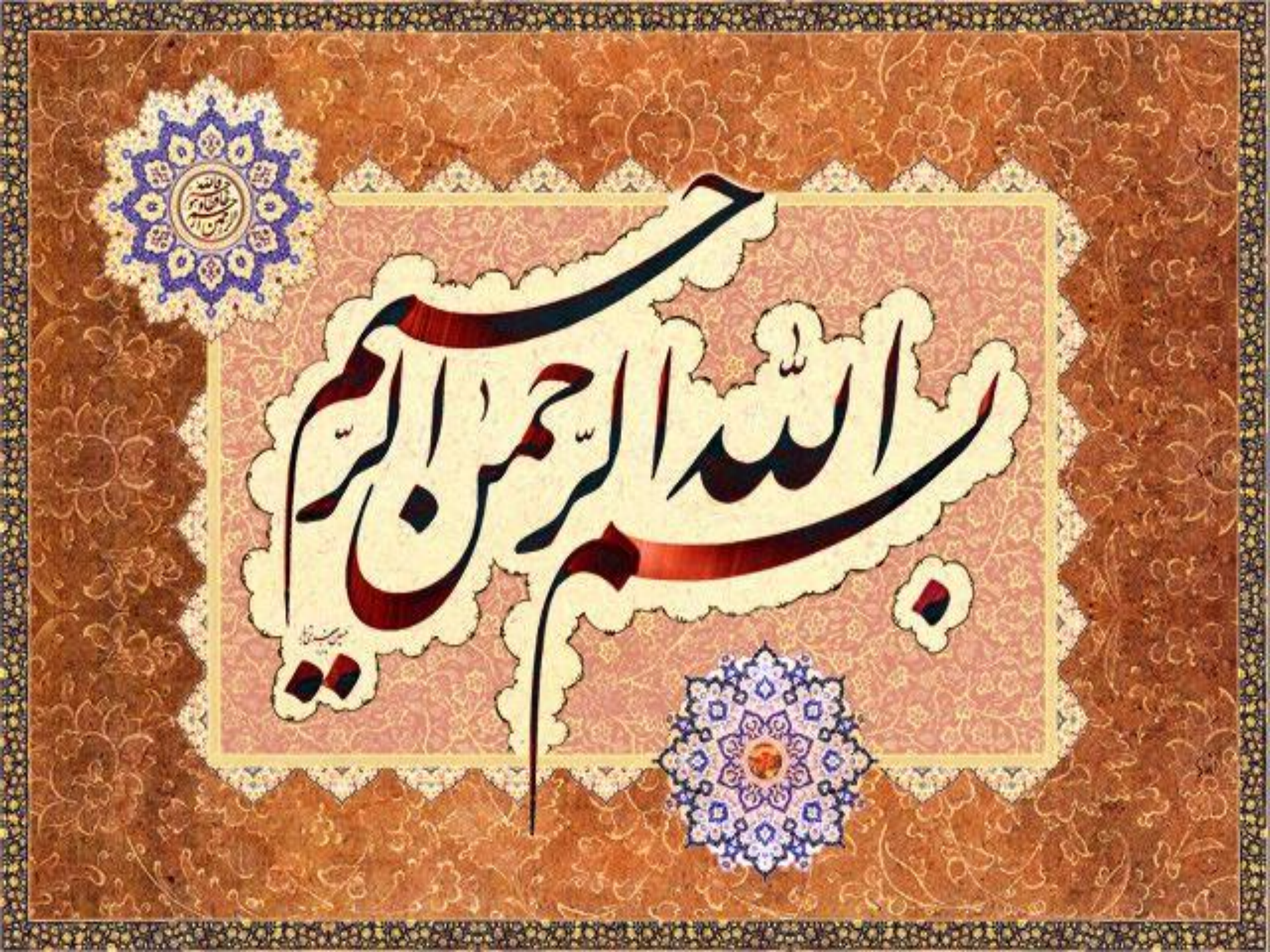
بسم الله الرحمن الرحیم

Journal Club Presentation

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Public Reporting On Hospital Process Improvements Is Linked To Better Patient Outcomes

Rachel M. Werner and Eric T. Bradlow. Public Reporting On Hospital Process Improvements Is Linked To Better Patient Outcomes. Health Affairs 29, no.7 (2010):1319-1324

Background/rationale

- In April 2005 the CMS began publishing information about hospitals' performance and rankings based on these measures on a Web site called Hospital Compare (http://www.hospitalcompare.hhs.gov/).
- Measuring and reporting hospital performance goals:
  - to provide consumers with the information they need to choose
  - to spur improvements in quality over time

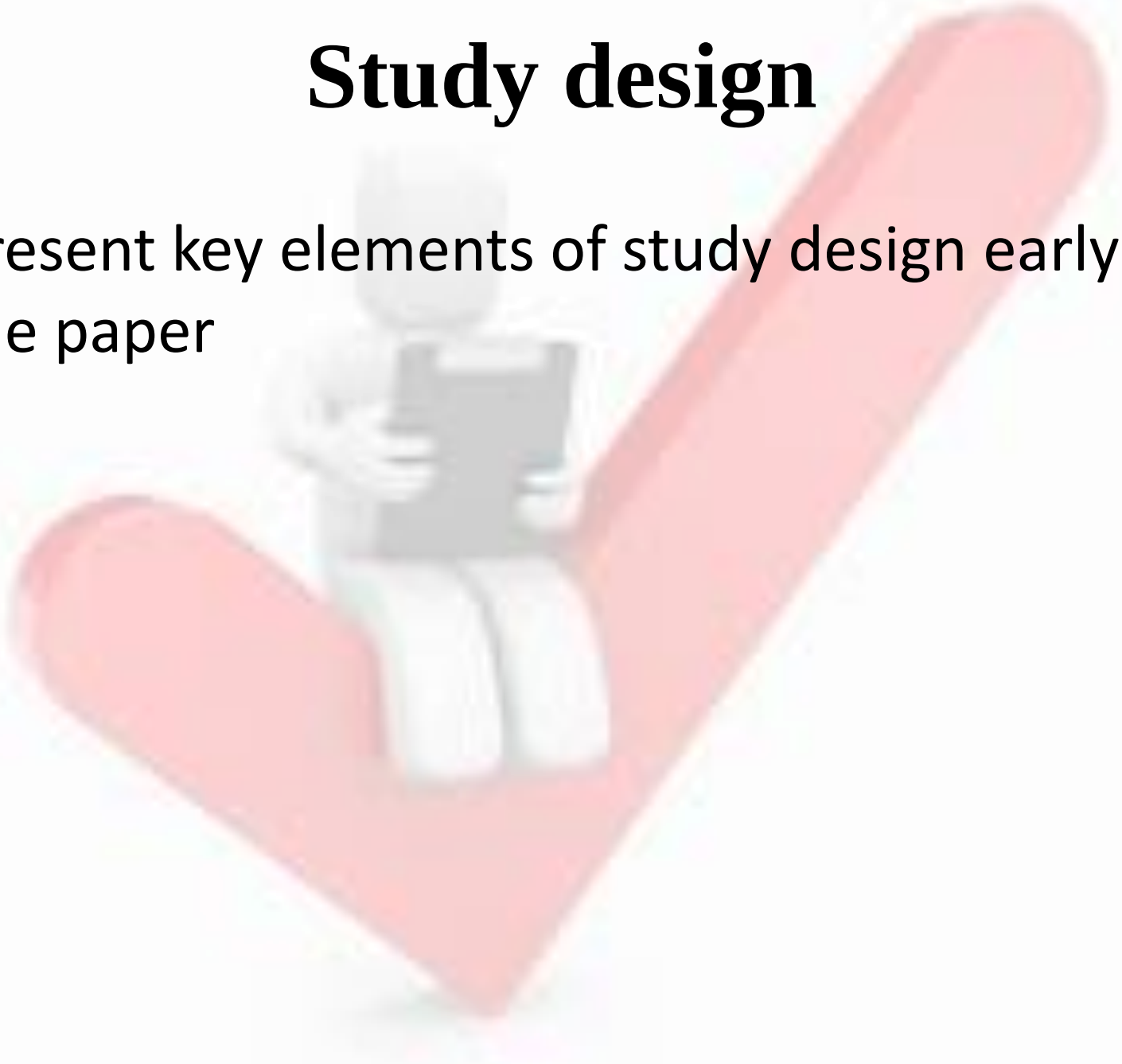
Objectives:

- Our objective was to examine changes in hospital process performance in the first three years after Hospital Compare was initiated.
- We also endeavored to test whether these changes in performance were correlated with changes in hospital mortality rates, lengths-of-stay, and readmission rates.

Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses

Study design

- Present key elements of study design early in the paper



Setting

- Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection

Participants; hospitals

- data from 3,476 acute care, nonfederal U.S. hospitals that publicly reported quality information on the CMS Hospital Compare Web site from 2004 through 2006.
- We excluded 159 hospitals that had fewer than 15 observations per year in Hospital Compare
- 829 hospitals that did not consistently report their performance over the study period

PATIENT OUTCOME

- all Medicare Part A claims, from 2004 to 2006

Exclusion criteria:

- Who were transferred out of the hospital or who left the hospital against medical advice.
- people enrolled in managed care,
- patients who died prior to discharge,
- those who were discharged to a hospice.

- (a) Give the eligibility criteria, and the sources and methods of selection of participants

Quantitative variables

- PERFORMANCE MEASURES:
- ***Acute myocardial infarction***
  - Aspirin at admission
  - Aspirin at discharge
  - ACE inhibitor for left ventricular dysfunction
  - Beta-blocker at admission
  - Beta-blocker at discharge
- ***Heart failure***
  - Assessment of left ventricular function
  - ACE inhibitor for left ventricular dysfunction
- ***Pneumonia***
  - Oxygenation assessment
  - Pneumococcal vaccination
  - Timing of initial antibiotic therapy

Quantitative variables

- PATIENT OUTCOME MEASURES:

- condition-specific thirty-day mortality rates (risk-adjusted),
- lengths-of-stay,
- thirty-day readmission rates

- Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
- Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable

Data sources/measurement

- Hospital Compare Web site from 2004 through 2006. These data were made publicly available starting in April 2005 and are updated quarterly.
- PATIENT OUTCOME MEASURES: Using the 100 percent Medicare Provider Analysis and Review (MedPAR) file, which contains all Medicare Part A claims, from 2004 to 2006, we evaluated patient outcomes every six months during the study period.

- For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group

Statistical methods

- Average changes in performance across all hospitals and within hospitals are described for 2004 and 2006.
- To test the correlation between changes in performance improvement and changes in patient outcomes, we performed longitudinal hospital-level analyses using hospital fixed effects.

Statistical methods

- correlation coefficients to examine the relationship between the hospital cost index and performance on the HQA summary scores as well as a hospital's nurse-to-census ratio.
- multivariable logistic models with patient discharges as the unit of analysis, to examine whether risk-adjusted hospital costs were independently associated with mortality, adjusting for patient characteristics and co-morbidities as described above, and we

- (a) Describe all statistical methods, including those used to control for confounding
- (b) Describe any methods used to examine subgroups and interactions
- (c) Explain how missing data were addressed
- (d) If applicable, describe analytical methods taking account of sampling strategy Statistical methods 12
- (e) Describe any sensitivity analyses

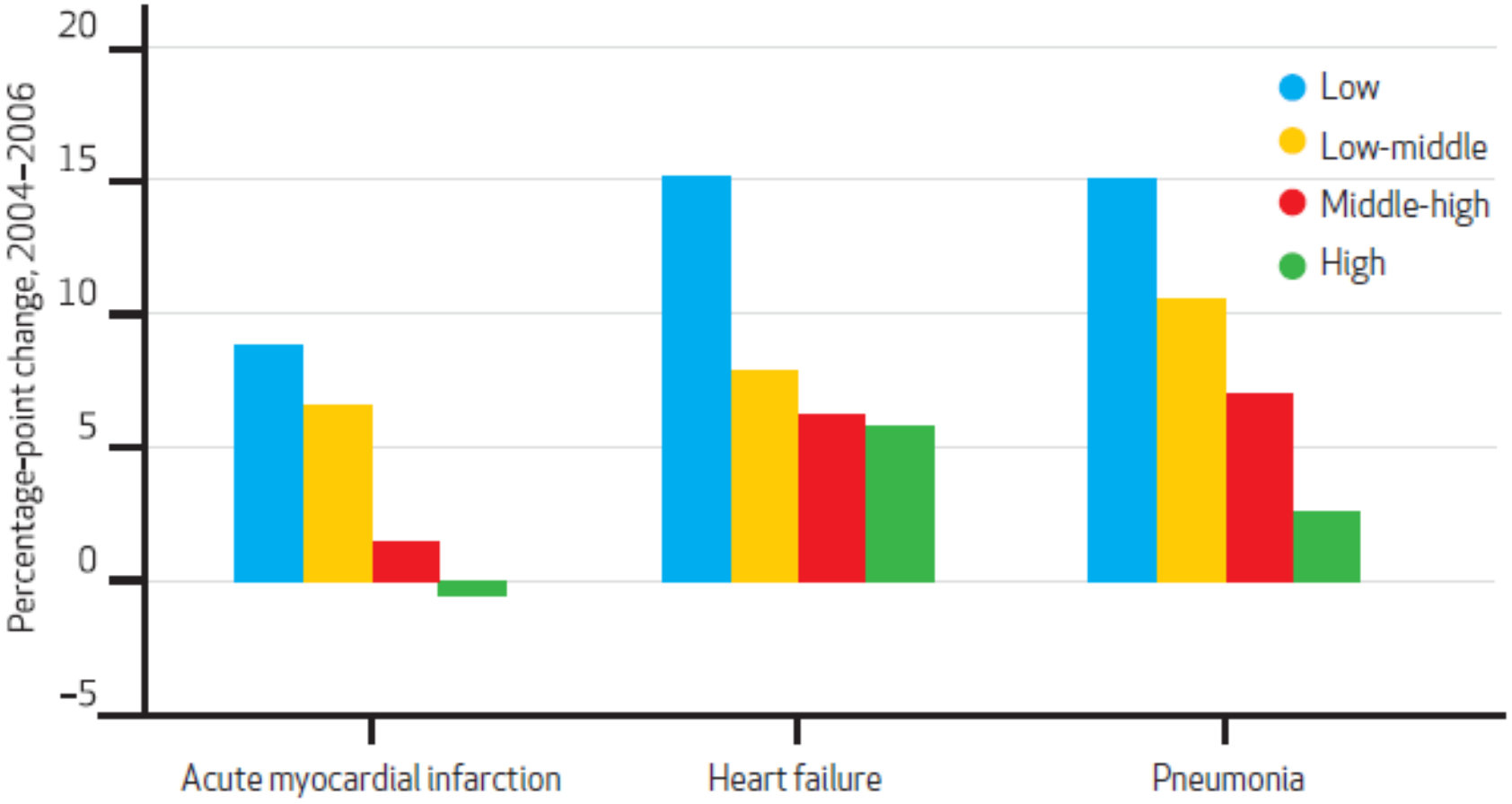
EXHIBIT 1

Hospitals' Performance On Individual And Composite Performance Measures In 2004 And 2006

	No. of hospitals	Mean performance score		*p* value
		2004 (%)	2006 (%)	
ACUTE MYOCARDIAL INFARCTION				
Aspirin at admission	2,426	93.9	95.7	< 0.001
Aspirin at discharge	2,035	91.5	95.0	< 0.001
ACE inhibitor for left ventricular dysfunction	1,026	79.6	87.0	< 0.001
Beta-blocker at admission	2,349	88.8	92.5	< 0.001
Beta-blocker at discharge	2,084	90.2	95.0	< 0.001
Composite score	2,454	90.5	93.8	< 0.001
HEART FAILURE				
Assessment of left ventricular function	3,304	82.6	88.8	< 0.001
ACE inhibitor for left ventricular dysfunction	2,342	75.8	85.3	< 0.001
Composite score	3,305	79.5	87.1	< 0.001
PNEUMONIA				
Oxygenation assessment	3,394	98.2	99.5	< 0.001
Pneumococcal vaccination	3,254	46.8	73.3	< 0.001
Timing of initial antibiotic therapy	3,330	73.2	80.5	< 0.001
Composite score	3,394	77.7	86.5	< 0.001

SOURCE Authors' analysis of Hospital Compare data. **NOTE** ACE is angiotensin-converting enzyme.

Change In Hospital Performance From 2004 To 2006, In Four Groups Of Hospitals By Baseline Performance In 2004



Appendix Exhibit 3. Change in hospital outcomes for a 10-point improvement in performance†

	Change in hospital outcomes (95% CI)	P Value‡
Acute myocardial infarction		
Mortality rate, %	-0.6 (-0.9 to -0.2)	0.001
Length of stay, days	-0.19 (-0.23 to -0.15)	<.001
Readmission for any reason, %	-0.5 (-0.9 to -0.2)	0.006
Heart Failure		
Mortality rate, %	.04 (-0.04 to 0.1)	0.37
Length of stay, days	0.01 (-0.01 to 0.02)	0.31
Readmission for any reason, %	-0.2 (-0.3 to -0.1)	<.001
Pneumonia		
Mortality rate, %	-0.3 (-0.4 to -0.1)	0.008
Length of stay, days	0.13 (0.10 to 0.16)	<.001
Readmission for any reason, %	-0.1 (-0.3 to 0.1)	0.27

† Change in hospital outcomes are based on regression results and scaled to a 10-point improvement in performance rather than the 100-point improvement in performance that regression predicts.
‡ P value based on multivariate regression

EXHIBIT 4

Estimated Change In Hospital Outcomes For A Ten-Point Improvement In Performance Within Groups Of Hospitals, Divided Into Four Groups Based On Baseline Performance In 2004

Group by hospital baseline performance[a]	No. of hospitals	Change in hospital outcomes		
		Mortality[b]	Length-of-stay[c]	Readmission[b]
ACUTE MYOCARDIAL INFARCTION				
Low	613	−0.9 ***	−0.18 ****	−0.5
Low-middle	613	−1.2 ****	−0.26 ****	−0.7
Middle-high	614	−0.7 **	−0.29 ****	−1.9 ****
High	613	−0.1	−0.03	1.0
HEART FAILURE				
Low	840	0.0	0.01	−0.1
Low-middle	813	0.0	−0.01	−0.5 ****
Middle-high	826	−0.2 **	−0.03	−0.5 ****
High	826	0.0	0.01	0.0
PNEUMONIA				
Low	849	−0.2 **	0.14 ****	0.0
Low-middle	848	−0.4 ***	0.15 ****	−0.2
Middle-high	849	−0.3 **	0.10 ***	−0.5 **
High	848	0.2	0.11 **	−0.2

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures

Outcome data	15	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion

- hospital process performance improved, particularly among hospitals with low baseline performance.
- improvements were associated with improved outcomes, most notably for acute myocardial infarction, although the magnitude of outcome improvements varied across baseline performance levels.
- These results do not prove conclusively whether or not public reporting caused an improvement in processes or outcomes.
- However, they are encouraging, as efforts aimed at improving process performance may improve quality more broadly.

- The positive association between improved process and improved outcomes did not extend to hospitals with high baseline performance, possibly because of a ceiling effect.

Implications

- improvement-based performance measures reveal different information than do cross-sectional rank-based measures.
- our results emphasize the importance of using pay-for-reporting before relying on pay for-performance.
- As performance improves and variation in performance between providers diminishes, the relationship between improved process and outcomes breaks down.
- the lack of correlation between process measures and some outcomes raises questions about the usefulness of measuring these process measures alone.

Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results

Thanks for your attention