

February 8, 2018

The Honorable Seema Verma  
Administrator  
Centers for Medicare & Medicaid Services  
U.S. Department of Health and Human Services  
Hubert H. Humphrey Building, Room 445–G  
200 Independence Avenue, SW  
Washington, DC 20201

Re: Potential Association between CMS Hospital Readmissions Reduction Program and Increased Mortality Outcomes

Dear Administrator Verma:

On behalf of the physician and medical student members of the American Medical Association (AMA), I am writing in regard to a recent article published in the *Journal of the American Medical Association Cardiology (JAMA Cardio)* in which Gupta, et al. describe an association between implementation of the Centers for Medicare & Medicaid Services (CMS) Hospital Readmissions Reduction Program (HRRP), and an increase in mortality of fee-for service Medicare beneficiaries discharged after a heart failure admission.<sup>1</sup> In order to better understand the significance of the authors' findings within the larger body of literature on readmissions, and out of concern that a government sponsored program might be leading to negative unintended consequences such as, increased mortality, the AMA performed a literature search to evaluate whether the conclusions of Gupta and co-authors could be replicated. Due to the published literature using inconsistent data, such as not always using Medicare data, and because investigators used varying versions of the CMS readmission measures, our findings are inclusive and raise additional questions that the AMA believes are important to explore.

In order for CMS to evolve the program and ensure that readmission penalties are not contributing to negative patient outcomes, there is an urgent need to address the questions outlined below. We recommend that CMS work in conjunction with the Agency for Healthcare Research and Quality (AHRQ) to answer the initial set of issues. We believe that the AHRQ is best suited for this work because it is the agency at the U.S. Department of Health and Human Services (HHS) charged with enhancing the quality, appropriateness, and effectiveness of health care service. The AHRQ also has the acumen to answer questions around making improvements to the health care delivery system. The following are issues that should be explored to provide CMS and our health care system, including physicians and providers, better tools for discriminating between necessary or unnecessary admissions and to improve CMS' HRRP:

- There is a need to examine the data to determine if additional reductions in scores can be made using the existing measures in the HRRP since the readmission rates are now somewhat stable.

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<sup>1</sup> Gupta, Ankar, et al. Association of the Hospital Readmissions Reduction Program Implementation With Readmission and Mortality Outcomes in Heart Failure. *JAMA Cardiol.* 2017. doi:10.1001/jamacardio.2017.4265. Published online November 12, 2017.

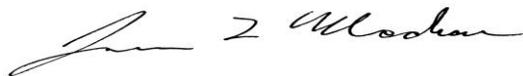
Minimal improvements (decreases in rates) are now seen for most if not all of the readmission measures, but it is not known whether the rates have plateaued because there is no more room for improvement and the measures are now capturing appropriate readmissions. To a certain degree, some level of readmissions is to be expected. However, we do not yet know with certainty what the appropriate target should be. There remains an urgent need to answer the question so that the benchmarks and program use evidence-based optimal performance scores. These unknowns lead us to ask two questions:

- Specifically, do the current measures in the program truly identify inappropriate readmissions at this point?
  - If CMS, physicians, and providers continue to try and drive down readmission rates even further, what additional unintended negative consequences for patients might be introduced?
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- To what degree is the reported association of lower readmissions with higher mortality found over longer or shorter time periods such as, one year or one week, as compared to the first 30-days post discharge? Gupta and co-authors report that the inverse association was still evident at one year. To what degree are any positive or negative correlations related to all-cause mortality and/or readmissions versus the condition-specific outcome?
  - It is also worth examining whether trends exist based on unadjusted data and adjusted data. Most of the studies identified through our search of the literature, including Dharmarajan, et al. (2017), used risk-adjusted data. Most individual patient care decisions are not made with risk-adjustment in mind. To better understand the outliers (those who are readmitted), there is a need to investigate and determine whether there are small, but important associations between reduced readmissions rates with patient mortality. Therefore, are we masking the issue by only examining the adjusted rates? Examination of unadjusted and risk-adjusted rates could help address this concern.

All our recommendations on areas of further study are intended to help CMS, physicians, providers, and patients better understand the impact our actions have on readmissions and outcomes. Examining the effects, expected and unexpected, of new and existing programs is exactly what it means to have a learning health system—one that evaluates, shares, and acts.

Thank you for your attention to our concerns. We stand ready to work with CMS and others to address any unintended consequences CMS' quality programs may have on patient care. If you have any questions regarding this letter, please contact Koryn Rubin, Assistant Director, Federal Affairs, at [koryn.rubin@ama-assn.org](mailto:koryn.rubin@ama-assn.org) or 202-789-7408.

Sincerely,



James L. Madara, MD

Attachment

Authors	Title	Journal info	Abstract
Heidenreich PA, Sahay A, Kapoor JR, Pham MX, Massie B.	Divergent trends in survival and readmission following a hospitalization for heart failure in the Veterans Affairs health care system 2002 to 2006.	<a href="#">J Am Coll Cardiol. 2010 Jul 27;56(5):362-8. doi: 10.1016/j.jacc.2010.02.053.</a>	<p>Objective: This study sought to determine recent trends over time in heart failure hospitalization, patient characteristics, treatment, rehospitalization, and mortality within the Veterans Affairs health care system.</p> <p>Background: Use of recommended therapies for heart failure has increased in the U.S. However, it is unclear to what extent hospitalization rates and the associated mortality have improved.</p> <p>Methods: We compared rates of hospitalization for heart failure, 30-day rehospitalization for heart failure, and 30-day mortality following discharge from 2002 to 2006 in the Veterans Affairs Health Care System. Odds ratios for outcome were adjusted for patient diagnoses within the past year, laboratory data, and for clustering of patients within hospitals.</p> <p>Results: We identified 50,125 patients with a first hospitalization for heart failure from 2002 to 2006. Mean age did not change (70 years), but increases were noted for most comorbidities (mean Charlson score increased from 1.72 to 1.89, <math>p &lt; 0.0001</math>). Heart failure admission rates remained constant at about 5 per 1,000 veterans. Mortality at 30 days decreased (7.1% to 5.0%, <math>p &lt; 0.0001</math>), whereas rehospitalization for heart failure at 30 days increased (5.6% to 6.1%, <math>p = 0.11</math>). After adjustment for patient characteristics, the odds ratio for rehospitalization in 2006 (vs. 2002) was 0.54 (95% confidence interval [CI]: 0.47 to 0.61) for mortality, but 1.21 (95% CI: 1.04 to 1.41) for heart failure rehospitalization at 30 days.</p> <p>Conclusions: Recent mortality and rehospitalization rates in the Veterans Affairs Health Care System have trended in opposite directions. These results have implications for using rehospitalization as a measure of quality of care.</p>

O'Connor CM, Fiuzat M.

Is rehospitalization after heart failure admission a marker of poor quality? Time for re-evaluation.

[J Am Coll Cardiol. 2010 Jul 27;56\(5\):369-71. doi: 10.1016/j.jacc.2010.02.054.](#)

Editorial comment on Heidenrich article

"Proper identification, shorter lengths of stay, and greater rates of early follow-up at 14 days may have led to fewer in-hospital complications such as infections and earlier detection of impending decompensation."

"Mortality rates in-hospital dropped significantly by approximately 40%, in the face of an important 1-day reduction in length of stay. We, therefore, believe that sicker patients who were likely to die in 2002 remained alive in 2006, living with comorbidities and a higher class of heart failure symptoms, resulting in greater exposure to rehospitalization."

"The following is proposed: If a health system/hospital has a low mortality rate in this population, they should receive no deduction on quality if there is an increase in rehospitalization rates, as this may be one of the strategies for improving outcome. If, however, the mortality rate is high, and the rehospitalization rate is high, this should signal quality deficiencies and increased scrutiny. An alternative proposal should be that total hospital days alive over a 30-day period should be the marker of quality following heart failure hospitalization."

Wang Y, Eldridge N, Metersky ML, Sonnenfeld N, Fine JM, Pandolfi MM, Eckenrode S, Bakullari A, Galusha DH, Jaser L, Verzier NR, Nuti SV, Hunt D, Normand SL, Krumholz HM. Association Between Hospital Performance on Patient Safety and 30-Day Mortality and Unplanned Readmission for Medicare Fee-for-Service Patients With Acute Myocardial Infarction

[J Am Heart Assoc. 2016 Jul 12;5\(7\). pii: e003731. doi: 10.1161/JAHA.116.003731.](#)

Background: Little is known regarding the relationship between hospital performance on adverse event rates and hospital performance on 30-day mortality and unplanned readmission rates for Medicare fee-for-service patients hospitalized for acute myocardial infarction (AMI). Methods and results: Using 2009-2013 medical record-abstracted patient safety data from the Agency for Healthcare Research and Quality's Medicare Patient Safety Monitoring System and hospital mortality and readmission data from the Centers for Medicare & Medicaid Services, we fitted a mixed-effects model, adjusting for hospital characteristics, to evaluate whether hospital performance on patient safety, as measured by the hospital-specific risk-standardized occurrence rate of 21 common adverse event measures for which patients were at risk, is associated with hospital-specific 30-day all-cause risk-standardized mortality and unplanned readmission rates for Medicare patients with AMI. The unit of analysis was at the hospital level. The final sample included 793 acute care hospitals that treated 30 or more Medicare patients hospitalized for AMI and had 40 or more adverse events for which patients were at risk. The occurrence rate of adverse events for which patients were at risk was 3.8%. A 1% point change in the risk-standardized occurrence rate of adverse events was associated with average changes in the same direction of 4.86% points (95% CI, 0.79-8.94) and 3.44% points (95% CI, 0.19-6.68) for the risk-standardized mortality and unplanned readmission rates, respectively. Conclusions: For Medicare fee-for-service patients discharged with AMI, hospitals with poorer patient safety performance were also more likely to have poorer performance on 30-day all-cause mortality and on unplanned readmissions.

Suter LG, Li SX, Grady JN, Lin Z, Wang Y, Bhat KR, Turkmani D, Spivack SB, Lindenauer PK, Merrill AR, Drye EE, Krumholz HM, Bernheim SM. National patterns of risk-standardized mortality and readmission after hospitalization for acute myocardial infarction, heart failure, and pneumonia: update on publicly reported outcomes measures based on the 2013 release. [J Gen Intern Med. 2014 Oct;29\(10\):1333-40. doi: 10.1007/s11606-014-2862-5. Epub 2014 May 14.](#)

Background: The Centers for Medicare & Medicaid Services publicly reports risk-standardized mortality rates (RSMRs) within 30-days of admission and, in 2013, risk-standardized unplanned readmission rates (RSRRs) within 30-days of discharge for patients hospitalized with acute myocardial infarction (AMI), heart failure (HF), and pneumonia. Current publicly reported data do not focus on variation in national results or annual changes.

Objective: Describe U.S. hospital performance on AMI, HF, and pneumonia mortality and updated readmission measures to provide perspective on national performance variation.

Design: To identify recent changes and variation in national hospital-level mortality and readmission for AMI, HF, and pneumonia, we performed cross-sectional panel analyses of national hospital performance on publicly reported measures.

Participants: Fee-for-service Medicare and Veterans Health Administration beneficiaries, 65 years or older, hospitalized with principal discharge diagnoses of AMI, HF, or pneumonia between July 2009 and June 2012. RSMRs/RSRRs were calculated using hierarchical logistic models risk-adjusted for age, sex, comorbidities, and patients' clustering among hospitals.

Results: Median (range) RSMRs for AMI, HF, and pneumonia were 15.1% (9.4-21.0%), 11.3% (6.4-17.9%), and 11.4% (6.5-24.5%), respectively.

Median (range) RSRRs for AMI, HF, and pneumonia were 18.2% (14.4-24.3%), 22.9% (17.1-30.7%), and 17.5% (13.6-24.0%), respectively. Median RSMRs declined for AMI (15.5% in 2009-2010, 15.4% in 2010-2011, 14.7% in 2011-2012) and remained similar for HF (11.5% in 2009-2010, 11.9% in 2010-2011, 11.7% in 2011-2012) and pneumonia (11.8% in 2009-2010, 11.9% in 2010-2011, 11.6% in 2011-2012). Median hospital-level RSRRs declined: AMI (18.5% in 2009-2010, 18.5% in 2010-2011, 17.7% in 2011-2012), HF (23.3% in 2009-2010, 23.1% in 2010-2011, 22.5% in 2011-2012), and pneumonia (17.7% in 2009-2010, 17.6% in 2010-2011, 17.3% in 2011-2012).

Nuti SV, Qin L, Rumsfeld JS, Ross JS, Masoudi FA, Normand SL, Murugiah K, Bernheim SM, Suter LG, Krumholz HM. Association of Admission to Veterans Affairs Hospitals vs Non-Veterans Affairs Hospitals With Mortality and Readmission Rates Among Older Men Hospitalized With Acute Myocardial Infarction, Heart Failure, or Pneumonia.

[JAMA. 2016 Feb 9;315\(6\):582-92. doi: 10.1001/jama.2016.0278.](#)

Importance: Little contemporary information is available about comparative performance between Veterans Affairs (VA) and non-VA hospitals, particularly related to mortality and readmission rates, 2 important outcomes of care.

Objective: To assess and compare mortality and readmission rates among men in VA and non-VA hospitals.

Design, setting, and participants: Cross-sectional analysis involving male Medicare fee-for-service beneficiaries aged 65 years or older hospitalized between 2010 and 2013 in VA and non-VA acute care hospitals for acute myocardial infarction (AMI), heart failure (HF), or pneumonia using the Medicare Standard Analytic Files and Enrollment Database together with VA administrative claims data. To avoid confounding geographic effects with health care system effects, we studied VA and non-VA hospitals within the same metropolitan statistical area (MSA).

Exposures: Hospitalization in a VA or non-VA hospital in MSAs that contained at least 1 VA and non-VA hospital.

Main outcomes and measures: For each condition, 30-day risk-standardized mortality rates and risk-standardized readmission rates for VA and non-VA hospitals. Mean aggregated within-MSA differences in mortality and readmission rates were also assessed.

Results: We studied 104 VA and 1513 non-VA hospitals, with each condition-outcome analysis cohort for VA and non-VA hospitals containing at least 7900 patients (men;  $\geq 65$  years), in 92 MSAs. Mortality rates were lower in VA hospitals than non-VA hospitals for AMI (13.5% vs 13.7%,  $P = .02$ ; -0.2 percentage-point difference) and HF (11.4% vs 11.9%,  $P = .008$ ; -0.5 percentage-point difference), but higher for pneumonia (12.6% vs 12.2%,  $P = .045$ ; 0.4 percentage-point difference). In contrast, readmission rates were higher in VA hospitals for all 3 conditions (AMI, 17.8% vs 17.2%, 0.6 percentage-point difference; HF, 24.7% vs 23.5%, 1.2 percentage-point difference; pneumonia, 19.4% vs 18.7%, 0.7 percentage-point difference, all  $P < .001$ ). In within-MSA comparisons, VA hospitals had lower mortality

Glance LG, Li Y, Dick AW.

Impact on hospital ranking of basing readmission measures on a composite endpoint of death or readmission versus readmissions alone.

[BMC Health Serv Res. 2017 May 5;17\(1\):327. doi: 10.1186/s12913-017-2266-4.](#)

Background: Readmission penalties are central to the Centers for Medicare and Medicaid Services (CMS) efforts to improve patient outcomes and reduce health care spending. However, many clinicians believe that readmission metrics may unfairly penalize low-mortality hospitals because mortality and readmission are competing risks. The objective of this study is to compare hospital ranking based on a composite outcome of death or readmission versus readmission alone.

Methods: We performed a retrospective observational study of 344,565 admissions for acute myocardial infarction (AMI), congestive heart failure (CHF), or pneumoniae (PNEU) using population-based data from the New York State Inpatient Database (NY SID) between 2011 and 2013.

Hierarchical logistic regression modeling was used to estimate separate risk-adjustment models for the (1) composite outcome (in-hospital death or readmission within 7-days), and (2) 7-day readmission. Hospital rankings based on the composite measure and the readmission measure were compared using the intraclass correlation coefficient and kappa analysis. Results: Using data from all AMI, CHF, and PNEU admissions, there was substantial agreement between hospital adjusted odds ratio (AOR) based on the composite outcome versus the readmission outcome (intraclass correlation coefficient [ICC] 0.67; 95% CI: 0.56, 0.75). For patients admitted with AMI, there was moderate agreement (ICC 0.53; 95% CI: 0.41, 0.62); for CHF, substantial agreement (ICC 0.72; 95% CI: 0.66, 0.78); and for PNEU, substantial agreement (ICC 0.71; 95% CI: 0.61, 0.78). There was moderate agreement when the composite and readmission metrics were used to classify hospitals as high, average, and low-performance hospitals ( $\kappa = 0.54$ , SE = 0.050). For patients admitted with AMI, there was slight agreement ( $\kappa = 0.14$ , SE = 0.037) between the two metrics.

Conclusion: Hospital performance on readmissions is significantly different from hospital performance on a composite metric based on readmissions and mortality. CMS and policy makers should consider re-assessing the use of readmission metrics for measuring hospital performance.

Arundel C, Lam PH, Khosla R, Blackman MR, Fonarow GC, Morgan C, Zeng Q, Fletcher RD, Butler J, Wu WC, Deedwania P, Love TE, White M, Aronow WS, Anker SD, Allman RM, Ahmed A. Association of 30-Day All-Cause Readmission with Long-Term Outcomes in Hospitalized Older Medicare Beneficiaries with Heart Failure.

[Am J Med. 2016 Nov;129\(11\):1178-1184. doi: 10.1016/j.amjmed.2016.06.018. Epub 2016 Jul 9.](#)

Background: Heart failure is the leading cause for 30-day all-cause readmission. We examined the impact of 30-day all-cause readmission on long-term outcomes and cost in a propensity score-matched study of hospitalized patients with heart failure.

Methods: Of the 7578 Medicare beneficiaries discharged with a primary diagnosis of heart failure from 106 Alabama hospitals (1998-2001) and alive at 30 days after discharge, 1519 had a 30-day all-cause readmission. Using propensity scores for 30-day all-cause readmission, we assembled a matched cohort of 1516 pairs of patients with and without a 30-day all-cause readmission, balanced on 34 baseline characteristics (mean age 75 years, 56% women, 24% African American).

Results: During 2-12 months of follow-up after discharge from index hospitalization, all-cause mortality occurred in 41% and 27% of matched patients with and without a 30-day all-cause readmission, respectively (hazard ratio 1.68; 95% confidence interval 1.48-1.90; P <.001). This harmful association of 30-day all-cause readmission with mortality persisted during an average follow-up of 3.1 (maximum, 8.7) years (hazard ratio 1.33; 95% confidence interval 1.22-1.45; P <.001). Patients with a 30-day all-cause readmission had higher cumulative all-cause readmission (mean, 6.9 vs 5.1; P <.001), a longer cumulative length of stay (mean, 51 vs 43 days; P <.001), and a higher cumulative cost (mean, \$38,972 vs \$34,025; P = .001) during 8.7 years of follow-up.

Conclusions: Among Medicare beneficiaries hospitalized for heart failure, 30-day all-cause readmission was associated with a higher risk of subsequent all-cause mortality, higher number of cumulative all-cause readmission, longer cumulative length of stay, and higher cumulative cost.

Rinne ST, Castaneda J, Lindenauer PK, Cleary PD, Paz HL, Gomez JL. Chronic Obstructive Pulmonary Disease Readmissions and Other Measures of Hospital Quality. [Am J Respir Crit Care Med. 2017 Jul 1;196\(1\):47-55. doi: 10.1164/rccm.201609-1944OC.](#)

Rationale: The Centers for Medicare and Medicaid Services recently implemented financial penalties to reduce hospital readmissions for select conditions, including chronic obstructive pulmonary disease (COPD). Despite growing pressure to reduce COPD readmissions, it is unclear how COPD readmission rates are related to other measures of quality, which could inform efforts on common organizational factors that affect high-quality care.

Objectives: To examine the association between COPD readmissions and other quality measures.

Methods: We analyzed data from the 2015 Centers for Medicare and Medicaid Services annual files, downloaded from the Hospital Compare website. We included 3,705 hospitals nationwide that had publically reported data on COPD readmissions. We compared COPD readmission rates to other risk-adjusted measures of quality, including readmission and mortality rates for other conditions, and patient reports about care experiences.

Measurements and main results: There were modest correlations between COPD readmission rates and readmission rates for other medical conditions, including heart failure ( $r = 0.39$ ;  $P < 0.01$ ), acute myocardial infarction ( $r = 0.30$ ;  $P < 0.01$ ), pneumonia ( $r = 0.38$ ;  $P < 0.01$ ), and stroke ( $r = 0.29$ ;  $P < 0.01$ ). In contrast, we found low correlations between COPD readmission rates and readmission rates for surgical conditions, as well as mortality rates for all measured conditions. There were significant correlations between COPD readmission rates and all patient experience measures.

Conclusions: These findings suggest there may be common organizational factors that influence multiple disease-specific outcomes. As pay-for-performance programs focus attention on individual disease outcomes, hospitals may benefit from in-depth assessments of organizational factors that affect multiple aspects of hospital quality.

Pandey A, Golwala H, Xu H, DeVore AD, Matsouaka R, Pencina M, Kumbhani DJ, Hernandez AF, Bhatt DL, Heidenreich PA, Yancy CW, de Lemos JA, Fonarow GC. Association of 30-Day Readmission Metric for Heart Failure Under the Hospital Readmissions Reduction Program With Quality of Care and Outcomes. [JACC Heart Fail. 2016 Dec;4\(12\):935-946. doi: 10.1016/j.jchf.2016.07.003.](#) Objectives: This study sought to determine whether processes of care and long-term clinical outcomes for heart failure (HF) admissions across Get With The Guidelines-Heart Failure (GWTG-HF) program participating centers differ according to HF-specific risk-adjusted 30-day readmission rates (excess readmission ratio [ERR]) as determined by the Hospital Readmission Reduction Program (HRRP). Background: HRRP penalizes hospitals with higher than expected risk-adjusted 30-day readmission rates (ERR >1) for common conditions including HF. However, it is unclear whether the differences in this metric of hospital performance used by HRRP and related penalties are associated with measured quality of care and long-term outcomes. Methods: We analyzed data from the GWTG-HF registry linked to Medicare claims from July 2008 to June 2011. Using publically available data on HF-ERR in 2013, we stratified the participating centers into groups with low (HF-ERR ≤1) versus high (HF-ERR >1) risk-adjusted readmission rates. We compared the care quality, in-hospital, and 1-year clinical outcomes across the 2 groups in unadjusted and multivariable adjusted analysis. Results: The analysis included 171 centers with 43,143 participants; 49% of centers had high risk-adjusted 30-day readmission rates (HF-ERR >1). There were no differences between the low and high risk-adjusted 30-day readmission groups in median adherence rate to all performance measures (95.7% vs. 96.5%; p = 0.37) or median percentage of defect-free care (90.0% vs. 91.1%; p = 0.47). The composite 1-year outcome of death or all-cause readmission rates was also not different between the 2 groups (median 62.9% vs. 65.3%; p = 0.10). The high HF-ERR group had higher 1-year all-cause readmission rates (median 59.1% vs. 54.7%; p = 0.01). However, the 1-year mortality rates were lower among high versus low HF-ERR group with a trend toward statistical significance (median 28.2% vs. 31.7%; p = 0.07). Conclusions: Quality of care and clinical outcomes were comparable among hospitals with high versus low risk-adjusted 30-day HF readmission rates.

Gupta A, Allen LA, Bhatt DL, Cox M, DeVore AD, Heidenreich PA, Hernandez AF, Peterson ED, Matsouaka RA, Yancy CW, Fonarow GC. Association of the Hospital Readmissions Reduction Program Implementation With Readmission and Mortality Outcomes in Heart Failure. [JAMA Cardiol. 2017 Nov 12. doi: 10.1001/jamacardio.2017.4265. \[Epub ahead of print\]](https://doi.org/10.1001/jamacardio.2017.4265)

Importance: Public reporting of hospitals' 30-day risk-standardized readmission rates following heart failure hospitalization and the financial penalization of hospitals with higher rates have been associated with a reduction in 30-day readmissions but have raised concerns regarding the potential for unintended consequences.

Objectives: To examine the association of the Hospital Readmissions Reduction Program (HRRP) with readmission and mortality outcomes among patients hospitalized with heart failure within a prospective clinical registry that allows for detailed risk adjustment

Design, setting and participants: Interrupted time-series and survival analyses of index heart failure hospitalizations were conducted from January 1, 2006, to December 31, 2014. This study included 115 245 fee-for-service Medicare beneficiaries across 416 US hospital sites participating in the American Heart Association Get With The Guidelines-Heart Failure registry. Data analysis took place from January 1, 2017, to June 8, 2017.

Exposures: Time intervals related to the HRRP were before the HRRP implementation (January 1, 2006, to March 31, 2010), during the HRRP implementation (April 1, 2010, to September 30, 2012), and after the HRRP penalties went into effect (October 1, 2012, to December 31, 2014).

Main outcomes and measures: Risk-adjusted 30-day and 1-year all-cause readmission and mortality rates.

Results: The mean (SD) age of the study population (n = 115 245) was 80.5 (8.4) years, 62 927 (54.6%) were women, and 91 996 (81.3%) were white and 11 037 (9.7%) were black. The 30-day risk-adjusted readmission rate declined from 20.0% before the HRRP implementation to 18.4% in the HRRP penalties phase (hazard ratio (HR) after vs before the HRRP implementation, 0.91; 95% CI, 0.87-0.95; P < .001). In contrast, the 30-day risk-adjusted mortality rate increased from 7.2% before the HRRP implementation to 8.6% in the HRRP penalties phase (HR after vs before the HRRP implementation, 1.18; 95% CI, 1.10-1.27; P < .001). The 1-year risk-adjusted readmission and mortality rates followed a similar pattern as the

Dharmarajan K, Wang Y, Lin Z, Normand ST, Ross JS, Horwitz LI, Desai NR, Suter LG, Drye EE, Bernheim SM, Krumholz HM.	Association of Changing Hospital Readmission Rates With Mortality Rates After Hospital Discharge.	<a href="#">JAMA. 2017 Jul 18;318(3):270-278.</a> <a href="#">doi: 10.1001/jama.2017.8444.</a>	<p>Importance: The Affordable Care Act has led to US national reductions in hospital 30-day readmission rates for heart failure (HF), acute myocardial infarction (AMI), and pneumonia. Whether readmission reductions have had the unintended consequence of increasing mortality after hospitalization is unknown.</p> <p>Objective: To examine the correlation of paired trends in hospital 30-day readmission rates and hospital 30-day mortality rates after discharge.</p> <p>Design, setting and participants: Retrospective study of Medicare fee-for-service beneficiaries aged 65 years or older hospitalized with HF, AMI, or pneumonia from January 1, 2008, through December 31, 2014.</p> <p>Exposure: Thirty-day risk-adjusted readmission rate (RARR).</p> <p>Main outcomes and measures: Thirty-day RARRs and 30-day risk-adjusted mortality rates (RAMRs) after discharge were calculated for each condition in each month at each hospital in 2008 through 2014. Monthly trends in each hospital's 30-day RARRs and 30-day RAMRs after discharge were examined for each condition. The weighted Pearson correlation coefficient was calculated for hospitals' paired monthly trends in 30-day RARRs and 30-day RAMRs after discharge for each condition.</p> <p>Results: In 2008 through 2014, 2 962 554 hospitalizations for HF, 1 229 939 for AMI, and 2 544 530 for pneumonia were identified at 5016, 4772, and 5057 hospitals, respectively. In January 2008, mean hospital 30-day RARRs and 30-day RAMRs after discharge were 24.6% and 8.4% for HF, 19.3% and 7.6% for AMI, and 18.3% and 8.5% for pneumonia. Hospital 30-day RARRs declined in the aggregate across hospitals from 2008 through 2014; monthly changes in RARRs were -0.053% (95% CI, -0.055% to -0.051%) for HF, -0.044% (95% CI, -0.047% to -0.041%) for AMI, and -0.033% (95% CI, -0.035% to -0.031%) for pneumonia. In contrast, monthly aggregate changes across hospitals in hospital 30-day RAMRs after discharge varied by condition: HF, 0.008% (95% CI, 0.007% to 0.010%); AMI, -0.003% (95% CI, -0.005% to -0.001%); and pneumonia, 0.001% (95% CI, -0.001% to 0.003%). However, correlation coefficients in hospitals' paired monthly changes in 30-</p>
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Krumholz HM, Lin Z, Keenan PS, Chen J, Ross JS, Drye EE, Bernheim SM, Wang Y, Bradley EH, Han LF, Normand SL. Relationship between hospital readmission and mortality rates for patients hospitalized with acute myocardial infarction, heart failure, or pneumonia.

[JAMA. 2013 Feb 13;309\(6\):587-93.](#)  
[doi: 10.1001/jama.2013.333.](#)

Importance: The Centers for Medicare & Medicaid Services publicly reports hospital 30-day, all-cause, risk-standardized mortality rates (RSMRs) and 30-day, all-cause, risk-standardized readmission rates (RSRRs) for acute myocardial infarction, heart failure, and pneumonia. The evaluation of hospital performance as measured by RSMRs and RSRRs has not been well characterized.

Objective: To determine the relationship between hospital RSMRs and RSRRs overall and within subgroups defined by hospital characteristics. Design, setting and participants: We studied Medicare fee-for-service beneficiaries discharged with acute myocardial infarction, heart failure, or pneumonia between July 1, 2005, and June 30, 2008 (4506 hospitals for acute myocardial infarction, 4767 hospitals for heart failure, and 4811 hospitals for pneumonia). We quantified the correlation between hospital RSMRs and RSRRs using weighted linear correlation; evaluated correlations in groups defined by hospital characteristics; and determined the proportion of hospitals with better and worse performance on both measures.

Main outcome measures: Hospital 30-day RSMRs and RSRRs.

Results: Mean RSMRs and RSRRs, respectively, were 16.60% and 19.94% for acute myocardial infarction, 11.17% and 24.56% for heart failure, and 11.64% and 18.22% for pneumonia. The correlations between RSMRs and RSRRs were 0.03 (95% CI, -0.002 to 0.06) for acute myocardial infarction, -0.17 (95% CI, -0.20 to -0.14) for heart failure, and 0.002 (95% CI, -0.03 to 0.03) for pneumonia. The results were similar for subgroups defined by hospital characteristics. Although there was a significant negative linear relationship between RSMRs and RSRRs for heart failure, the shared variance between them was only 2.9% ( $r^2 = 0.029$ ), with the correlation most prominent for hospitals with RSMR <11%.

Conclusion and relevance: Risk-standardized mortality rates and readmission rates were not associated for patients admitted with an acute myocardial infarction or pneumonia and were only weakly associated,

<p>Pandey A, Golwala H, Hall HM, Wang TY, Lu D, Xian Y, Chiswell K, Joynt KE, Goyal A, Das SR, Kumbhani D, Julien H, Fonarow GC, de Lemos JA.</p>	<p>Association of US Centers for Medicare and Medicaid Services Hospital 30-Day Risk-Standardized Readmission Metric With Care Quality and Outcomes After Acute Myocardial Infarction: Findings From the National Cardiovascular Data Registry/Acute Coronary Treatment and Intervention Outcomes Network Registry-Get With the Guidelines.</p>	<p><a href="#">JAMA Cardiol. 2017 Jul 1;2(7):723-731.</a> <a href="#">doi: 10.1001/jamacardio.2017.1143.</a></p>	<p>Importance: The US Centers for Medicare and Medicaid Services Hospital Readmissions Reduction Program penalizes hospitals with higher-than-expected risk-adjusted 30-day readmission rates (excess readmission ratio [ERR] &gt; 1) after acute myocardial infarction (MI). However, the association of ERR with MI care processes and outcomes are not well established. Objective: To evaluate the association between ERR for MI with in-hospital process of care measures and 1-year clinical outcomes. Design, setting and participants: Observational analysis of hospitalized patients with MI from National Cardiovascular Data Registry/Acute Coronary Treatment and Intervention Outcomes Network Registry-Get With the Guidelines centers subject to the first cycle of the Hospital Readmissions Reduction Program between July 1, 2008, and June 30, 2011. Exposures: The ERR for MI (MI-ERR) in 2011. Main outcomes and measures: Adherence to process of care measures during index hospitalization in the overall study population and risk of the composite outcome of mortality or all-cause readmission within 1 year of discharge and its individual components among participants with available Centers for Medicare and Medicaid Services-linked data. Results: The median ages of patients in the MI-ERR greater than 1 and tertiles 1, 2, and 3 of the MI-ERR greater than 1 groups were 64, 63, 64, and 63 years, respectively. Among 380 hospitals that treated a total of 176 644 patients with MI during the study period, 43% had MI-ERR greater than 1. The proportions of patients of black race, those with heart failure signs at admission, and bleeding complications increased with higher MI-ERR. There was no significant association between adherence to MI performance measures and MI-ERR (adjusted odds ratio, 0.94; 95% CI, 0.81-1.08, per 0.1-unit increase in MI-ERR for overall defect-free care). Among the 51 453 patients with 1-year outcomes data available, higher MI-ERR was associated with higher adjusted risk of the composite outcome and all-cause readmission within 1 year of discharge. This association was largely driven by readmissions early after discharge and was not significant in</p>
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Abdul-Aziz AA, Hayward RA, Aaronson KD, Hummel SL.	Association Between Medicare Hospital Readmission Penalties and 30- Day Combined Excess Readmission and Mortality.	<a href="#">JAMA Cardiol. 2017 Feb 1;2(2):200-203. doi: 10.1001/jamacardi o.2016.3704.</a>	<p>Importance: US hospitals receive financial penalties for excess risk-standardized 30-day readmissions and mortality in Medicare patients. Under current policy, readmission prevention is incentivized over 10-fold more than mortality reduction.</p> <p>Objective: To determine how penalties for US hospitals would change if policy equally weighted 30-day readmissions and mortality.</p> <p>Design, setting, and participants: Publicly available hospital-level data for fiscal year 2014 was obtained, including excess readmission ratio (ERR; risk-standardized predicted over expected 30-day readmissions) and 30-day mortality rates for heart failure, pneumonia, and acute myocardial infarction, as well as readmission penalties (as percent of Medicare Diagnosis Group payments). An excess mortality ratio (EMR) was calculated by dividing the risk-standardized predicted mortality by the national average mortality. Case-weighted aggregate ERR (ERRAGG) and EMR (EMRAGG) were calculated, and an excess combined outcome ratio (ECORAGG) was created by averaging ERRAGG and EMRAGG. We examined associations between readmission penalties, ERRAGG, EMRAGG, and ECORAGG. Analysis of variance was used to compare readmission penalties in hospitals with concordant (both ratios &gt;1 or &lt;1) and discordant performance by ERRAGG and ECORAGG.</p> <p>Main outcomes and measures: The primary outcome investigated was the association between readmission penalties and the calculated excess combined outcome ratio (ECORAGG).</p> <p>Results: In 1963 US hospitals with complete data, readmission penalties closely tracked excess readmissions (<math>r = 0.81</math>; <math>P &lt; .001</math>), but were minimally and inversely related with excess mortality (<math>r = -0.12</math>; <math>P &lt; .001</math>) and only modestly correlated with excess combined readmission and mortality (<math>r = 0.36</math>; <math>P &lt; .001</math>). Using hospitals with concordant ERRAGG and ECORAGG as the reference group, 17% of hospitals had an ECORAGG ratio less than 1 (ie, superior combined mortality/readmission outcome) with an ERRAGG ratio greater than 1, and received higher mean (SD) readmission penalties</p>
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Gorodeski EZ, Starling RC, Blackstone EH. Are all readmissions bad readmissions? N Engl J Med. 2010 Jul 15;363(3):297-8. doi: 10.1056/NEJMc1001882.

In this letter to the editor, physicians from Cleveland Clinic provide an overview of their analysis related to readmissions. Specifically, they "examined the association between risk-adjusted readmission and risk-adjusted death within 30 days after hospitalization for heart failure among 3857 hospitals included in the CMS Hospital Compare public reporting database ([www.hospitalcompare.hhs.gov](http://www.hospitalcompare.hhs.gov)) that had no missing data." They found "a higher occurrence of readmissions after index admissions for heart failure was associated with lower risk-adjusted 30-day mortality. Our findings suggest that readmissions could be "adversely" affected by a competing risk of death — a patient who dies during the index episode of care can never be readmitted. Hence, if a hospital has a lower mortality rate, then a greater proportion of its discharged patients are eligible for readmission. As such, to some extent, a higher readmission rate may be a consequence of successful care."

Parina RP, Chang DC, Rose JA, Talamini MA. Is a low readmission rate indicative of a good hospital?

[J Am Coll Surg.](#)  
[2015](#)  
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Background: Hospital readmissions are an increasing focus of health care policy. This study explores the association between 30-day readmissions and 30-day mortality for surgical procedures.

Study design: California longitudinal statewide data from 1995 to 2009 were analyzed for 7 complex procedures: abdominal aortic aneurysm repair, aortic valve replacement, bariatric surgery, coronary artery bypass grafting, esophagectomy, pancreatectomy, and percutaneous coronary intervention. Hospitals were categorized based on observed-to-expected (O/E) ratios for 30-day mortality and 30-day readmissions. Hospitals were considered "high" or "low" outliers if the 95% confidence intervals of their O/E ratios excluded 1 and "expected" if they included 1. Hospitals that were outliers in at least 1 metric were classified as "discordant" if their readmission and mortality rates were not both "high" or both "low," and "poorly discordant" in the particular scenario of high mortality with "expected" or "low" readmission rates.

Results: A total of 1,090,071 patients and 299 hospitals were analyzed for 7 procedures, representing a total of 1,150 clinical encounters. The overall 30-day mortality was 3.79% and the 30-day readmission was 12.69%. Of the total, 729 (63.3%) had "expected" O/E ratios for both outcomes. Among outliers, 358 (85.0%) were "discordant" and 100 (23.8%) were "poorly discordant."

Conclusions: Hospital readmission rate alone is a limited measure of quality given the poor correlation between hospital readmission and mortality rates. In this study, 85% of hospital outliers were "discordant" for readmission and mortality. Furthermore, almost a quarter of these discordant hospitals had "expected" or "low" readmission but "high" mortality rates. Quality metrics that focus exclusively on readmission rates overlook these discrepancies.