

All-Cause Admissions and Readmissions, Spring 2018 Cycle: CDP Report

TECHNICAL REPORT

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NATIONAL
QUALITY FORUM

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TECHNICAL REPORT

Executive Summary

Healthcare quality improvement efforts have focused for many years on reducing avoidable hospital admissions and readmissions. In recent years, this topic has prompted energetic study and discussion, particularly with respect to the appropriateness of certain readmissions measures for use in quality or performance evaluation. NQF currently has 49 endorsed all-cause and condition-specific admissions and readmissions measures addressing numerous settings. Several federal quality improvement programs have adopted these measures to reduce unnecessary admissions and readmissions by fostering improved care coordination across the healthcare system.

For this project, the Standing Committee evaluated the expanded specification of NQF #1789: *Hospital-Wide All-Cause Unplanned Readmission Measure* (HWR). This evaluation considered the expansion of this endorsed measure to assess readmissions at a new level of analysis: the accountable care organization. The expanded measure was reviewed against NQF's standard evaluation criteria. The All-Cause Admissions and Readmissions Standing Committee recommended the expanded measure for endorsement, and the Consensus Standards Approval Committee (CSAC) upheld the Committee's recommendation.

A brief summary of the expanded measure specification appears in the body of the report; a detailed summary of the Committee's discussion and ratings of the criteria for the measure are in [Appendix A](#).

Introduction

Reducing avoidable hospital admissions and readmissions remains a key focus of healthcare quality improvement. Avoidable admissions and readmissions take patients away from their daily lives, expose them to potential harms in an acute setting, and contribute to unnecessary healthcare spending. To incentivize reductions in unnecessary readmissions, measures of readmission rates have become a focus of value-based purchasing programs. While a wide variety of healthcare stakeholders support the goal of reducing unnecessary hospitalizations, debates remain on the target rate of readmissions, appropriate methods for attribution, and if these measures should be linked to provider payment. Systematic reviews have found that less than a third of readmissions might be considered preventable.¹ Moreover, many factors related to readmission rates may be outside of a hospital's control, such as the social risk of its patients or the resources available to the community it serves. On the other hand, high rates of readmissions have been associated with poor care coordination and low-quality care, and are also associated with higher healthcare spending and increased exposure to medical risk. Several interventions have been found to help reduce avoidable admissions and readmissions rates, such as improved communication of patient discharge instructions, coordination with post-acute care providers and primary care physicians, and the reduction of complications such as hospital-acquired conditions.^{2,3}

To incentivize reductions in inappropriate hospitalizations, CMS expanded accountability for avoidable readmissions throughout its quality reporting and payment programs. The Hospital Readmissions Reduction (HRRP) program reduces payment rates to hospitals with higher-than-expected readmission rates. The Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act) required CMS to implement quality measures for potentially preventable readmissions to long-term care hospitals, inpatient rehabilitation facilities, skilled nursing facilities, and home health agencies. Finally, CMS' Merit-Based Incentive Payment System (MIPS), which adjusts Medicare payments at the physician level, includes an option of an all-cause hospital readmission measure for groups with at least 16 clinicians and a sufficient number of cases.⁴ Groups that report on the readmission measure are eligible for higher payment rates than clinician groups that do not. Given the increased use of readmission measures across settings of care, ensuring their scientific merit is more important than ever.

In this project, the All-Cause Admissions and Readmissions Standing Committee considered the expansion of NQF #1789 *Hospital Wide Unplanned All-Cause Readmission* for use in accountable care organizations and recommended the measure for endorsement. The expanded measure is currently used in the Medicare Shared Savings Program.

NQF Portfolio of Performance Measures for All-Cause Admissions and Readmissions

The All-Cause Admissions and Readmissions Standing Committee ([Appendix C](#)) oversees NQF's portfolio of All-Cause Admissions and Readmissions measures ([Appendix B](#)) which includes all-cause and condition-specific measures. This portfolio contains over 40 admission and readmission measures addressing numerous healthcare settings (Table 1).

Table 1. NQF Admissions and Readmissions Portfolio of Measures

	All-Cause	Condition-Specific
Hospital	5	14
Home health	4	0
Skilled nursing facility	4	0
Long-term care facility	1	0
Inpatient rehab facility	1	0
Inpatient psychiatric facility	1	0
Dialysis facility	2	0
Health plan	1	0
Population-based	4	11
Hospital outpatient/ambulatory surgery center	0	1
Total	23	26

The remaining measures are assigned to other portfolios. These include patient-reported outcome and transition of care measures (Patient Experience and Function), and a variety of condition-specific readmission measures (Surgery and Perinatal).

All-Cause Admissions and Readmissions Measure Evaluation

On June 26, 2018, the All-Cause Admissions and Readmissions Standing Committee evaluated one expanded measure against [NQF's standard evaluation criteria](#).

Table 2. All-Cause Admissions and Readmissions Measure Evaluation Summary

	Expansion of Endorsement
Measures under consideration	1
Measures recommended for endorsement	1

Comments Received Prior to Committee Evaluation

NQF solicits comments on endorsed measures on an ongoing basis through the [Quality Positioning System \(QPS\)](#). In addition, NQF solicits comments for a continuous 16-week period during each evaluation cycle via an online tool located on the project webpage. For this evaluation cycle, the commenting period opened on May 1, 2018 and closed on August 29, 2018. Two comments were submitted prior to June 20, 2018 and were subsequently shared with the Committee prior to the measure evaluation meeting. ([Appendix F](#)).

Overarching Issues

During the measure evaluation meeting, the Standing Committee discussed a number of issues related to readmission measurement.

Impact of Declining Readmission Rates

The Committee noted that readmission rates have decreased in recent years.⁵ In its June 2018 report, the Medicare Payment Advisory Commission (MedPAC) found that readmission rates have declined since the inception of the Hospital Readmissions Reduction Program (HRRP) and that readmission rates for conditions included in the program declined more rapidly than for conditions not specifically addressed.⁶ MedPAC found that from 2010 to 2016 unadjusted readmission rates fell by 3.6 percentage points for acute myocardial infarctions (AMI), 3.0 percentage points for heart failure, and 2.3 percentage points for pneumonia. In comparison, readmission rates fell an average of 1.4 percentage points across conditions not addressed in the HRRP. The developer for the expanded version of measure #1789 provided 2015 data showing that readmission rates ranged from a minimum of 13.1 percent to a maximum of 17.5 percent, with the 10th percentile at 14.0 percent, the 50th percentile at 14.8 percent, and the 90th percentile at 15.7 percent.

The Committee agreed that significant progress has been made in reducing avoidable readmissions and emphasized the importance of reducing avoidable admissions to improve patient outcomes and reduce unnecessary healthcare spending. However, the Committee cautioned that the appropriate rate of readmissions is not known, and as payment policies continue to incentivize the reduction of readmissions, it is essential to monitor for unintended negative consequences. Research has questioned if the implementation of the HRRP has resulted in increases in mortality rates.⁷ However, other studies did not find a correlation between increased mortality and decreased readmissions at the hospital level.⁸ In its June 2018 report, MedPAC did not find a relationship between decreasing readmission rates and increased mortality.⁹ However, as downward pressure continues to exist, the Committee noted that it is important to continue to monitor, as some readmissions will be necessary and not the result of suboptimal care.

An increase in the use of observation stays and emergency department holding is cited as another potential consequence of decreasing readmission rates. Some argue that patients may prefer treatment in an outpatient setting if possible,¹⁰ while others note that patients may experience negative consequences from observation stays such as less timely and less coordinated care.¹¹ Observation stays can occur in the emergency department, in a dedicated unit, or in a setting similar to being admitted as an inpatient, leading to varying patient experience and time in the hospital.¹² Finally, patients may incur financial hardship if they require post-acute care after an observation stay, as Medicare will not cover a skilled nursing facility stay after an observation stay.¹³ Because of the potential consequences to patients, the Committee recognized the need to continue to monitor for increased use of ED visits and observation stays as potential consequences of the use of readmission measures.

Using Measurement to Promote Shared Accountability

Measures of hospital readmissions have become common markers of healthcare quality and are used across numerous settings and payment programs. The Committee noted that because of this, the readmission of one patient could be counted in several measures, assessing quality for multiple providers. For example, a readmission could count in the numerator of a measure assessing a hospital's readmission rate as well as a skilled nursing facility's (SNF) if the patient was readmitted to the hospital from the SNF. Some Committee members noted this could be particularly challenging in an accountable

care organization. However, other Committee members noted that the goal of an ACO is to promote shared accountability and coordinated care, and holding both providers jointly responsible for a readmission can help incentivize providers to work together.

The Committee highlighted the need to promote shared accountability and improved communications to continue to drive reductions in avoidable readmission rates. In particular, the Committee highlighted the role that technology and telehealth could play in reducing readmissions. Telehealth provides a continued opportunity for providers to connect with patients and could help providers to keep patients in an outpatient setting or lower level of care when patients need close monitoring. The Committee noted that readmissions can often result from communication failures between providers or between a provider and a patient, resulting in a potentially avoidable escalation. Telehealth has the ability to connect providers, providers with patients, and help patients manage their care at home. However, challenges such as the lack of infrastructure and reimbursements could hinder the adoption of telehealth.

Role of Social Risk in Measurement of ACOs

The use of readmission measures for payment has raised questions about how much control a healthcare provider can have over a patient's outcomes, as healthcare outcomes are influenced by both the care received and patient factors. In particular, stakeholders have raised concerns about the potential impact of social risk factors, as there is a growing body of evidence demonstrating how these factors can influence health outcomes. The Committee recognized the growing body of evidence demonstrating a relationship between social risk factors and readmissions and reiterated the need to consider the potential influence of social risk factors on the results of admission and readmission measures. The Committee noted the need to ensure that ACOs serving people with social risk factors are not penalized unfairly, especially when readmission measures are publicly reported or used to determine payment. The Committee emphasized the need to maximize the predictive value of a risk-adjustment model and noted its expectation that developers will continue testing the risk-adjustment model with additional social risk factors in an effort to better understand unmeasured patient risk. However, the Committee also recognized that ACOs may be uniquely situated to address social determinants of health and could play an important role in the reduction of healthcare disparities.

Summary of Measure Evaluation

The following brief summary of the measure evaluation highlights the major issues that the Committee considered. Details of the Committee's discussion and ratings of the criteria are included in [Appendix A](#).

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) (Centers for Medicare & Medicaid Services [CMS]: Endorsement (Expanded Specifications)

Description: For the hospital-wide readmission (HWR) measure that was previously endorsed and is used in the Hospital Inpatient Quality Reporting Program (IQR), the measure estimates a hospital-level risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories:

surgery/gynecology; general medicine; cardiorespiratory; cardiovascular; and neurology. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP), the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. **Measure Type:** Outcome; **Level of Analysis:** Facility, Integrated Delivery System; **Setting of Care:** Clinician Office/Clinic, Hospital, Hospital: Acute Care Facility; **Data Source:** Claims (Only).

NQF #1789 was initially reviewed in 2012 and was endorsed for the facility level of analysis. In this project, the developer requested an expansion of the measure's endorsement to cover the assessment of readmissions at the ACO level. To support this expansion, the developer submitted updated evidence and additional testing analyses to demonstrate the reliability and validity of the measure to assess readmission rates for ACOs. The Standing Committee evaluated the updated evidence and testing information submitted for this measure.

The Standing Committee agreed that there are actions an ACO could take to reduce hospital readmissions and that the evidence presented to support the measure was acceptable. The Committee agreed that the testing provided demonstrated that the measure was reliable and valid for use in ACOs. The Committee did raise concerns about the lack of social risk factors in the risk-adjustment model but recognized the role ACOs could play in improving care coordination for vulnerable patients. The Standing Committee acknowledged the measure's current use in accountability programs and found the measure to be feasibly reported and usable. The Standing Committee generally agreed that the measure met the NQF criteria of endorsement at the new level of analysis and recommended endorsement of NQF #1789 as expanded to assess readmission rates in ACOs.

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accessed July 2018.

Appendix A: Details of Measure Evaluation

Rating Scale: H=High; M=Moderate; L=Low; I=Insufficient; NA=Not Applicable

Measure Endorsed

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

[Submission](#) | [Specifications](#)

Description: For the hospital-wide readmission (HWR) measure that was previously endorsed and is used in the Hospital Inpatient Quality Reporting Program (IQR), the measure estimates a hospital-level risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology; general medicine; cardiorespiratory; cardiovascular; and neurology, each of which will be described in greater detail below. The measure also indicates the hospital-level standardized risk ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome. CMS annually reports the measure for patients who are 65 years or older, are enrolled in fee-for-service (FFS) Medicare, and hospitalized in non-federal hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP), the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in FFS Medicare and are ACO assigned beneficiaries.

Numerator Statement: The outcome for the HWR measure is 30-day readmission. We define readmission as an inpatient admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission. The outcome for the ACR measure is also 30-day readmission. The outcome is defined identically to what is described above for the HWR measure.

Denominator Statement: The measure at the hospital level includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US hospitals (including territories) with a complete claims history for the 12 months prior to admission. The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals. Additional details are provided in S.9 Denominator Details.

Exclusions: The measure excludes index admissions for patients:

1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals;
2. Without at least 30 days post-discharge enrollment in FFS Medicare;
3. Discharged against medical advice (AMA);
4. Admitted for primary psychiatric diagnoses;
5. Admitted for rehabilitation; or
6. Admitted for medical treatment of cancer.

Adjustment/Stratification: Statistical risk model

Level of Analysis: Facility, Integrated Delivery System

Setting of Care: Clinician Office/Clinic, Hospital, Hospital : Acute Care Facility

Type of Measure: Outcome

Data Source: Claims (Only)

Measure Steward: Centers for Medicare & Medicaid Services (CMS)

STANDING COMMITTEE MEETING [6/26/2018]

1. Importance to Measure and Report:

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Yes-18; No-0** 1b. Performance Gap: **H-1; M-14; L-3; I-0**

Rationale:

- The Standing Committee determined that the evidence provided by developers was acceptable and appropriate for the measure.
- The Committee agreed there is a performance gap for ACOs and opportunity for improvement, yet also acknowledged that the performance gap is shrinking.
- Committee members noted that the 30-day attribution period is appropriate for an ACO.
- Some Committee members expressed concern about double-counting patients during a single reporting period if patients move across payment structures.

2. Scientific Acceptability of Measure Properties:

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)

2a. Reliability: **H-0; M-18; L-0; I-0**; 2b. Validity: **H-0; M-13; L-5; I-0**

Rationale:

- The Committee noted that the reliability testing results differed between the ACO-level and the hospital level. However, the ACO-level measure produced an intraclass correlation coefficient (ICC) score of 0.62, which the Committee deemed sufficient. Some members expressed concern about the population's stability but noted that 70 percent of beneficiaries remain in the same ACO the next year.
- The Committee discussed the appropriateness and potential impact of adjustment for dual eligible status. Ultimately, the Committee noted that ACOs are incentivized to work with communities to address underlying factors that affect health.

3. Feasibility: H-14; M-4; L-0; I-0

(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/unintended consequences identified; 3d. Data collection strategy can be implemented)

Rationale:

- The measure is derived from administrative claims data.
- The Committee determined that the measure is feasible to implement for performance measurement.

4. Usability and Use:

(Used and useful to the intended audiences for 4a. Accountability and Transparency; 4b. Improvement; and 4c. Benefits outweigh evidence of unintended consequences)

4a. Use: **Pass-18; No Pass-0**; 4b. Usability: **H-0; M-18; L-0; I-0**

Rationale:

- The Committee noted the measure's use in several programs including the Medicare Shared Savings Program, Pioneer ACO model, and the Next Generation ACO model.
- Some Committee members expressed concerns about the measure's unintended consequences in their pre-evaluation comments. Specifically, Committee commenters noted potential disincentives for ACOs to enroll low-income, underserved beneficiaries as well as potential penalties for ACOs caring for safety-net patients. Ultimately, the Committee determined that the measure's performance results could be leveraged to drive efficient care.

5. Related and Competing Measures

- This measure is related to NQF #1768 Plan All-Cause Readmissions (PCR). NQF #1768 assesses the number of acute inpatient stays during the measurement year that were followed by an unplanned acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission in patients 18 years and older. Both readmission measures add value to the NQF Admissions and Readmissions portfolio since they assess different levels of analysis.

Standing Committee Recommendation for Endorsement for Expanded Level of Analysis: **Yes-18; No-0**

6. Public and Member Comment

- Commenters expressed concern regarding the risk-adjustment approach for the ACO-expanded version of NQF #1789. Several commenters recommended including social risk factors in the risk-adjustment model. These proposed social risk factors include—but are not limited to—sociodemographic status, language, post-discharge support structure, transportation, and/or pharmacies.
- Some commenters highlighted potential unintended consequences of expanding NQF #1789 to the ACO level of analysis. Specifically, one commenter noted the potential disincentive for ACOs to enroll low-income or underserved beneficiaries and mentioned that ACOs that serve a disproportionate share of vulnerable patients may incur penalties. A separate commenter agreed with the Committee's recommendation for continued monitoring to identify unintended

consequences such as reduced admissions related to increased rates of mortality and depletion of institutional resources.

- Some commenters expressed concerns that this measure is used in the Merit-based Incentive Payment System but has not been reviewed for NQF endorsement at the clinician or clinician group level of analysis. In particular, commenters raised concerns about the reliability score of the measure when used for clinicians or clinician groups. These comments were in reference to the facility-level version of NQF #1789, which is NQF-endorsed.
- All submitted comments and responses can be found in the [Comment Table](#).

7. Consensus Standards Approval Committee (CSAC) Endorsement Decision (October 23, 2018): Yes-16; No-1

- One CSAC member preliminarily pulled #1789 for discussion to highlight the measure's exclusion of social risk factors from the risk-adjustment model. This member did not believe the risk adjustment approach fulfilled the intent of NQF's Social Risk Trial.
- CSAC members reiterated the challenge of fairly measuring readmissions while not masking healthcare disparities. Members expressed varying opinions over whether or not adjusting for social risk factors would mask disparities or would better identify ACOs providing higher quality of care.
- One CSAC member questioned the developer's rationale to not add the tested social risk factors to the risk adjustment model because they did not improve the risk model's C-statistic.
- A Readmissions Standing Committee member provided perspective from the Readmissions Standing Committee's review and reiterated the Committee's expectation that measure developers continue testing the risk-adjustment model with additional social risk factors in an effort to better understand unmeasured patient risk.
- Additionally, one CSAC member noted this measure could be redundant with the nature of the ACO structure and that reducing readmissions is usually a key focus area of ACOs when seeking to reduce costs.
- The CSAC voted to uphold the Committee's recommendation to endorse the measure.

8. Appeals

- NQF received no appeals.

Appendix B: All-Cause Admissions and Readmissions Portfolio— Use in Federal Programs

NQF #	Title	Federal Programs: Finalized or Implemented as of December 1, 2018
0171	Acute Care Hospitalization During the First 60 Days of Home Health	Home Health Quality Reporting, Home Health Value Based Purchasing
0173	Emergency Department Use without Hospitalization During the First 60 Days of Home Health	Home Health Quality Reporting, Home Health Value Based Purchasing
0275	Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 5)	Medicaid
0277	Heart Failure Admission Rate (PQI 8)	Medicaid
0330	Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	Hospital Readmission Reduction Program, Hospital Compare
0505	Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	Hospital Readmission Reduction Program, Hospital Compare
0506	Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization	Hospital Readmission Reduction Program, Hospital Compare
1551	Hospital-level 30-day, all-cause risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)	Hospital Readmission Reduction Program, Hospital Compare
1891	Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization	Hospital Readmission Reduction Program, Hospital Compare
1768	Plan All-Cause Readmissions (PCR)	Medicare Part C Star Rating, Medicaid, Qualified Health Plan (QHP) Quality Rating System (QRS)
1789	Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	Hospital Inpatient Quality Reporting, Medicare Shared Savings Program, Hospital Compare
2496	Standardized Readmission Ratio	End Stage Renal Disease-Quality Incentive Program
2510	Skilled Nursing Facility 30-Day All-Cause Readmission Measure	Skilled Nursing Facility Value-Based Purchasing

NQF #	Title	Federal Programs: Finalized or Implemented as of December 1, 2018
2515	Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	Hospital Readmission Reduction Program, Hospital Compare
2539	Facility 7-Day Risk-Standardized Hospital Visit Rate after Outpatient Colonoscopy	Hospital Outpatient Quality Reporting, Ambulatory Surgical Center Quality Reporting, Hospital Compare
2860	Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)	Inpatient Psychiatric Facility Quality Reporting
2879	Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	Hospital Compare, Hospital Inpatient Quality Reporting
2886	Risk-Standardized Acute Admission Rates for Patients with Heart Failure	Medicare Shared Savings Program
2887	Risk-Standardized Acute Admission Rates for Patients with Diabetes	Medicare Shared Savings Program
2888	Risk-Standardized Acute Admission Rates for Patients with Multiple Chronic Conditions	Medicare Shared Savings Program

Appendix C: All-Cause Admissions and Readmissions Standing Committee and NQF Staff

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Appendix D: Measure Specifications

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

STEWARD

Centers for Medicare & Medicaid Services

DESCRIPTION

For the hospital-wide readmission (HWR) measure that was previously endorsed and is used in the Hospital Inpatient Quality Reporting Program (IQR), the measure estimates a hospital-level risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology; general medicine; cardiorespiratory; cardiovascular; and neurology, each of which will be described in greater detail below. The measure also indicates the hospital-level standardized risk ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome. CMS annually reports the measure for patients who are 65 years or older, are enrolled in fee-for-service (FFS) Medicare, and hospitalized in non-federal hospitals.

For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP), the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in FFS Medicare and are ACO assigned beneficiaries.

TYPE

Outcome

DATA SOURCE

Claims

LEVEL

Facility, Integrated Delivery System

SETTING

Inpatient/Hospital, Outpatient Services

NUMERATOR STATEMENT

The outcome for the HWR measure is 30-day readmission. We define readmission as an inpatient admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one

unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

The outcome for the ACR measure is also 30-day readmission. The outcome is defined identically to what is described above for the HWR measure.

NUMERATOR DETAILS

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);
2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and
3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

DENOMINATOR STATEMENT

The measure at the hospital level includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US hospitals (including territories) with a complete claims history for the 12 months prior to admission.

The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals.

DENOMINATOR DETAILS

To be included in the hospital level measure, cohort patients must be:

1. Enrolled in Medicare fee-for-service (FFS) Part A for the 12 months prior to the date of admission and during the index admission;
2. Aged 65 or over;
3. Discharged alive from a non-federal short-term acute care hospital; and
4. Not transferred to another acute care facility.

The ACO version of this measure has the additional criterion that only hospitalizations for ACO-assigned beneficiaries that meet all of the other criteria listed above are included. The cohort definition is otherwise identical to that of the HWR described below.

The measure aggregates the ICD-9 principal diagnosis and all procedure codes of the index admission into clinically coherent groups of conditions and procedures (condition categories or procedure categories) using the AHRQ CCS. There are a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as “other bacterial infections.” There are a total of 231 mutually exclusive procedure categories. Using the AHRQ CCS procedure and condition categories, the measure assigns each index hospitalization to one of five mutually exclusive specialty cohorts: surgery/gynecology, cardiorespiratory, cardiovascular, neurology, and medicine. The rationale behind this organization is that conditions typically cared for by the same team of clinicians are expected to experience similar added (or reduced) levels of readmission risk.

The measure first assigns admissions with qualifying AHRQ procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams.

The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ diagnosis category of the principal discharge diagnosis:

The Cardiorespiratory Cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable and patients are often simultaneously treated for several of these diagnoses.

The Cardiovascular Cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team.

The Neurology Cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team.

The Medicine Cohort includes all non-surgical patients who were not assigned to any of the other cohorts.

EXCLUSIONS

The measure excludes index admissions for patients:

1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals;
2. Without at least 30 days post-discharge enrollment in FFS Medicare;
3. Discharged against medical advice (AMA);
4. Admitted for primary psychiatric diagnoses;
5. Admitted for rehabilitation; or
6. Admitted for medical treatment of cancer.

EXCLUSION DETAILS

1. Admitted to a PPS-exempt cancer hospital, identified by the Medicare provider ID.
2. Admissions without at least 30 days post-discharge enrollment in FFS Medicare are determined using data captured in the Medicare Enrollment Database (EDB).
3. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.
4. Admitted for primary psychiatric disease, identified by a principal diagnosis in one of the specific AHRQ CCS categories listed in the attached data dictionary.

5. Admitted for rehabilitation care, identified by the specific ICD-9 diagnosis codes included in CCS 254 (Rehabilitation care; fitting of prostheses; and adjustment of devices).
6. Admitted for medical treatment of cancer, identified by the specific AHRQ CCS categories listed in the attached data dictionary.

RISK ADJUSTMENT

Statistical risk model

STRATIFICATION

N/A

TYPE SCORE

Rate/proportion; Better quality = Lower score

ALGORITHM

This measure estimates a hospital-level 30-day all-cause RSRR using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient, and hospital levels to account for variance in patient outcomes within and between hospitals (Normand et al., 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge using age, selected clinical covariates, and a hospital -specific effect. At the hospital level, the approach models the hospital- specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of a readmission, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand et al., 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the standardized readmission ratio (SRR) is calculated as the ratio of the number of “predicted” readmissions to the number of “expected” readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted based on the hospital’s performance with its observed case mix and service mix, and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix and service mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows a particular hospital’s performance, given its case mix and service mix, to be compared to an average hospital’s performance with the same case mix and service mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality.

For each specialty cohort, the “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors (found in Table D.9) and the hospital-specific effect on the risk of readmission. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are log transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are log transformed and summed over all

patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the data in that period.

The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide composite SRR. The composite SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in Appendix A and in the original methodology report (Horwitz et al., 2012).

The ACR quality measure was adapted from the HWR quality measure. The unit of analysis was changed from the hospital to the ACO. This was possible because both the HWR and ACR measures assess readmission performance for a population that clusters patients together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions are excluded for the ACR quality measure in the same way that they are excluded for the HWR measure. The ACR measure is calculated identically to what is described above for the HWR measure.

References:

Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012;

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N/A

Appendix E1: Related and Competing Measures (tabular format)

Comparison of NQF #1789 and NQF #1768

	1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1768 Plan All-Cause Readmissions (PCR)
Steward	CMS	NCQA
Description	For the hospital-wide readmission (HWR) measure that was previously endorsed and is used in the Hospital Inpatient Quality Reporting Program (IQR), the measure estimates a hospital-level risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology; general medicine; cardiorespiratory; cardiovascular; and neurology, each of which will be described in greater detail below. The measure also indicates the hospital-level standardized risk ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome. CMS annually reports the measure for patients who are 65 years or older, are enrolled in fee-for-service (FFS) Medicare, and hospitalized in non-federal hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP), the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in FFS Medicare and are ACO assigned beneficiaries.	For patients 18 years of age and older, the number of acute inpatient stays during the measurement year that were followed by an unplanned acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission. Data are reported in the following categories: 1. Count of Index Hospital Stays* (denominator) 2. Count of 30-Day Readmissions (numerator) 3. Average Adjusted Probability of Readmission *An acute inpatient stay with a discharge during the first 11 months of the measurement year (e.g., on or between January 1 and December 1).
Type	Outcome	Process
Data Source	Claims	Instrument-Based Data
Level	Facility / Integrated Delivery System	Health Plan / Integrated Delivery System
Setting	Inpatient/Hospital / Outpatient Services	Other; This measure does not specify a specific setting where care must be provided.
Numerator Statement	The outcome for the HWR measure is 30-day readmission. We define readmission as an inpatient admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission. The outcome for the ACR measure is also 30-day readmission. The outcome is defined identically to what is described above for the HWR measure.	At least one acute unplanned readmission for any diagnosis within 30 days of the date of discharge from the Index Hospital Stay, that is on or between the second day of the measurement year and the end of the measurement year.
Numerator Details	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index admission, excluding planned readmissions as defined below. Planned Readmission Algorithm (Version 4.0) The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. The Planned Readmission Algorithm has three fundamental principles: 1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation); 2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and 3. Admissions for acute illness or for complications of care are never planned. The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. The Planned Readmission Algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).	Step 1: Identify all acute inpatient stays with an admission date on or between the second day of the measurement year and the end of the measurement year (e.g., on or between January 2 and December 31 of the measurement year). Step 2: Acute-to-acute transfers: Keep the original admission date as the admission date for the Index Hospital Stay, but use the transfer’s discharge date as the discharge date for the Index Hospital Stay. Step 3: Exclude acute inpatient hospital discharges with a principal diagnosis of pregnancy or a principal diagnosis for a condition originating in the perinatal period. See corresponding Excel document for Pregnancy Value Set See corresponding Excel document for Perinatal Conditions Value Set Step 4: For each Index Hospital Stay, determine if any of the acute inpatient stays have an admission date within 30 days after the discharge date for the Index Hospital Stay.

	1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1768 Plan All-Cause Readmissions (PCR)
Denominator Statement	The measure at the hospital level includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US hospitals (including territories) with a complete claims history for the 12 months prior to admission. The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals.	Patients age 18 and older with a discharge from an acute inpatient stay (Index Hospital Stay) on or between January 1 and December 1 of the measurement year.
Denominator Details	To be included in the hospital level measure, cohort patients must be: 1. Enrolled in Medicare fee-for-service (FFS) Part A for the 12 months prior to the date of admission and during the index admission; 2. Aged 65 or over; 3. Discharged alive from a non-federal short-term acute care hospital; and 4. Not transferred to another acute care facility. The ACO version of this measure has the additional criterion that only hospitalizations for ACO-assigned beneficiaries that meet all of the other criteria listed above are included. The cohort definition is otherwise identical to that of the HWR described below. The measure aggregates the ICD-9 principal diagnosis and all procedure codes of the index admission into clinically coherent groups of conditions and procedures (condition categories or procedure categories) using the AHRQ CCS. There are a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as “other bacterial infections.” There are a total of 231 mutually exclusive procedure categories. Using the AHRQ CCS procedure and condition categories, the measure assigns each index hospitalization to one of five mutually exclusive specialty cohorts: surgery/gynecology, cardiorespiratory, cardiovascular, neurology, and medicine. The rationale behind this organization is that conditions typically cared for by the same team of clinicians are expected to experience similar added (or reduced) levels of readmission risk. The measure first assigns admissions with qualifying AHRQ procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams. The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ diagnosis category of the principal discharge diagnosis: The Cardiorespiratory Cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable and patients are often simultaneously treated for several of these diagnoses. The Cardiovascular Cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team. The Neurology Cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team. The Medicine Cohort includes all non-surgical patients who were not assigned to any of the other cohorts.	The denominator for this measure is based on acute discharges, not patients. Step 1: Identify all acute inpatient stays with a discharge date (Index Hospital Stay) during the first 11 months of the measurement year (e.g., on or between January 1 and December 1 of the measurement year). Step 2: If the discharge is an acute-to-acute transfer, keep the original admission date as the admission date for the Index Hospital Stay, but use the transfer’s discharge date as the discharge date for the Index Hospital Stay. Step 3: Exclude hospital stays where the admission date for the Index Hospital Stay is the same as the discharge date for the Index Hospital Stay. Step 4: Exclude stays for the following reasons: - Inpatient stays with discharges for death - Acute inpatient discharge with a principal diagnosis of pregnancy (See corresponding Excel document for Pregnancy Value Set) - Acute inpatient discharge with a principal diagnosis of a condition originating in the perinatal period (See corresponding Excel document for Perinatal Conditions Value Set) Step 5: For all acute inpatient discharges identified using steps 1-4, determine if there was a planned hospital stay within 30 days using all acute inpatient stays. Exclude any acute inpatient discharge as an Index Hospital Stay if the admission date of the first planned hospital stay is within 30 days and includes any of the following. - A principal diagnosis of maintenance chemotherapy (Chemotherapy Value Set) - A principal diagnosis of rehabilitation (Rehabilitation Value Set). - An organ transplant (Kidney Transplant Value Set, Bone Marrow Transplant Value Set, Organ Transplant Other Than Kidney Value Set). - A potentially planned procedure (Potentially Planned Procedure Value Set) without a principal acute diagnosis (Acute Condition Value Set). (See corresponding Excel document for the value sets reference above.) Step 6: Assign each acute inpatient stay to an age category (see S.12 for stratification details).
Exclusions	The measure excludes index admissions for patients: 1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals; 2. Without at least 30 days post-discharge enrollment in FFS Medicare; 3. Discharged against medical advice (AMA); 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.	Exclusions are included in the definition of the denominator (see S.9). Exclusions include discharges for death, pregnancy, prerinatal condition, or a discharge that is followed by a planned admission within 30 days.

	1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1768 Plan All-Cause Readmissions (PCR)
Exclusion Details	1. Admitted to a PPS-exempt cancer hospital, identified by the Medicare provider ID. 2. Admissions without at least 30 days post-discharge enrollment in FFS Medicare are determined using data captured in the Medicare Enrollment Database (EDB). 3. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. 4. Admitted for primary psychiatric disease, identified by a principal diagnosis in one of the specific AHRQ CCS categories listed in the attached data dictionary. 5. Admitted for rehabilitation care, identified by the specific ICD-9 diagnosis codes included in CCS 254 (Rehabilitation care; fitting of prostheses; and adjustment of devices). 6. Admitted for medical treatment of cancer, identified by the specific AHRQ CCS categories listed in the attached data dictionary.	- Inpatient stays with discharges for death - Acute inpatient discharge with a principal diagnosis of pregnancy (See corresponding Excel document for Pregnancy Value Set) - Acute inpatient discharge with a principal diagnosis of a condition originating in the perinatal period (See corresponding Excel document for Perinatal Conditions Value Set) - Admission followed by a planned readmission: Any acute inpatient discharge with a readmission within 30 days for maintenance chemotherapy (Chemotherapy Value Set), rehabilitation (Rehabilitation Value Set), organ transplant (Kidney Transplant Value Set, Bone Marrow Transplant Value Set, Organ Transplant Other Than Kidney Value Set), or a potentially planned procedure (Potentially Planned Procedure Value Set) without a principal acute diagnosis (Acute Condition Value Set). (See corresponding Excel document for the value sets above)
Risk Adjustment	Statistical risk model	Stratification by risk category/subgroup
Stratification	N/A	The measure reported by age categories. The age stratifications are: 18-44, 45-54, 55-64, 65-74, 75-84, 85+, Total RISK STRATIFICATION CATEGORIES For each index hospital stay, use the following steps to identify risk adjustment categories based on presence of surgeries, discharge condition, comorbidity, age and gender. Tables to classify conditions based on the CMS HCC model are available at www.ncqa.org. SURGERIES: Determine if the patient underwent surgery during the inpatient stay. Download the list of codes from the NCQA Web site www.ncqa.org (Table HCC-Surg) and use it to identify surgeries. Consider an index hospital stay to include a surgery if at least one procedure code in Table HCC-Surg is present from any provider between the admission and discharge dates. DISCHARGE CONDITION: Assign a discharge Clinical Condition (CC) category code to the index hospital stay based on its primary discharge diagnosis, using Table PCR-DischCC (available at www.ncqa.org). For acute-to-acute transfers, use the transfer’s primary discharge diagnosis. Exclude diagnoses that cannot be mapped to Table PCR-DischCC. COMORBIDITIES: STEP 1: Identify all diagnoses for encounters during the classification period. Include the following when identifying encounters: (Exclude the primary discharge diagnosis on the Index Hospital Stay) -Outpatient visits (See corresponding excel document Outpatient Value Set). -Observation visits (See corresponding excel document Observation Value Set). -Nonacute inpatient encounters (See corresponding excel document Nonacute Inpatient Value Set). -Acute inpatient encounters (See corresponding excel document Acute Inpatient Value Set). -ED visits (See corresponding excel document ED Value Set). STEP 2: Assign each diagnosis to one comorbid Clinical Condition (CC) category using Table CC—Comorbid (available at www.ncqa.org). Exclude all diagnoses that cannot be assigned to a comorbid CC category. For patients with no qualifying diagnoses from face-to-face encounters, skip to the Risk Adjustment Weighting section. All digits must match exactly when mapping diagnosis codes to the comorbid CCs. STEP 3: Determine HCCs for each comorbid CC identified. Refer to Table HCC—Rank (available at www.ncqa.org). For each stay’s comorbid CC list, match the comorbid CC code to the comorbid CC code in the table, and assign: the ranking group, the rank and the HCC. For comorbid CCs that do not match to Table HCC—Rank, use the comorbid CC as the HCC and assign a rank of 1. Note, one comorbid CC can map to multiple HCCs; each HCC can have one or more comorbid CCs. STEP 4: Assess each ranking group separately and select only the highest ranked HCC in each ranking group using the Rank column (1 is the highest rank possible). Drop all other HCCs in each ranking group, and de-duplicate the HCC list if necessary. STEP 5: Identify combination HCCs listed in Table HCC—Comb (available at www.ncqa.org). Some combinations suggest a greater amount of risk when observed together. For example, when diabetes and CHF are present, an increased amount of risk is evident. Additional HCCs are selected to account for these relationships. Compare each stay’s list of unique HCCs to those in the HCC column in Table HCC—Comb and assign any additional HCC conditions. For fully nested combinations (e.g., the diabetes/CHF combination is nested in the diabetes/ CHF/renal combination), use only the more comprehensive pattern. In this example, only the diabetes/CHF/renal combination is counted. For overlapping combinations (e.g., the CHF, COPD combination overlaps the

	1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1768 Plan All-Cause Readmissions (PCR)
		CHR/renal/ diabetes combination)), use both sets of combinations. In this example, both CHF/COPD and CHF/renal/diabetes combinations are counted. Based on the combinations, a member can have none, one or more of these added HCCs.
Type Score	Rate/proportion	Other; Rate/Proportion and Count: The Counts are the number of index hospital stays (denominator) and stays with a subsequent 30-day readmission (numerator). The Rate/Proportions are the average adjusted probability of readmission (expected rate) and the observed rate of readmission (numerator / denominator).
Algorithm	This measure estimates a hospital-level 30-day all-cause RSRR using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient, and hospital levels to account for variance in patient outcomes within and between hospitals (Normand et al., 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge using age, selected clinical covariates, and a hospital -specific effect. At the hospital level, the approach models the hospital- specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of a readmission, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand et al., 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals. Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the standardized readmission ratio (SRR) is calculated as the ratio of the number of “predicted” readmissions to the number of “expected” readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted based on the hospital’s performance with its observed case mix and service mix, and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix and service mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows a particular hospital’s performance, given its case mix and service mix, to be compared to an average hospital’s performance with the same case mix and service mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality. For each specialty cohort, the “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors (found in Table D.9) and the hospital-specific effect on the risk of readmission. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are log transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are log transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the data in that period. The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide composite SRR. The composite SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in Appendix A and in the original methodology report (Horwitz et al., 2012). The ACR quality measure was adapted from the HWR quality measure. The unit of analysis was changed from the hospital to the ACO. This was possible because both the HWR and ACR measures assess readmission performance for a population that clusters patients together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions are excluded for the ACR quality measure in the same way that they are excluded for the HWR measure. The ACR measure is calculated identically to what is described above for the HWR measure.	Look at denominator details, numerator details and the risk adjustment methodology for the measure logic in sections S.6, S.9, S.12 and S.14. CALCULATE THE OBSEVED RATE OF READMISSION Step 1: Determine the eligible population: Patients ages 18+ as of the discharge date for the Index Hospital Stay. Step 2: Determine number discharges meeting the denominator criteria as specified in Section S.9 above. Step 3: Stratify the denominator by age and gender categories as specified in Section S.12 above. Step 4: Determine the number of patients who meet the numerator criteria as specified in section S.6 above. Step 5: Calculate the Observed Rate of Readmission as Numerator/Denominator for each age/gender category. --- CALCULATE THE EXPECTED RATE OF READMISSION STEP 1: For each index hospital stay in the denominator identify risk adjustment categories based on presence of surgeries, discharge condition, comorbidity, age and gender as specified in Section S.12 above. STEP 2: For each index hospital stay in the denominator identify risk adjustment weights based on risk adjustment categories defined in step 1. See Section S.14 for full details. STEP 3: Use the formula below to calculate the adjusted probability of a readmission based on the sum of the weights for each index hospital stay. Adjusted probability of readmission = [exp (sum of weights for index hospital stay)] / [1 + exp (sum of weights for index hospital stay)] Note: “Exp” refers to the exponential or antilog function. This is the Expected Rate of Readmission --- CALCULATE THE OBSERVED/EXPECTED RATIO STEP 1: Calculate the ratio: Observed Rate or Readmissions/Expected Rate of Readmissions

	1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1768 Plan All-Cause Readmissions (PCR)
Submission items	• 0329: Risk-Adjusted 30-Day All-Cause Readmission Rate • 0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization • 0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. • 0506: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization • 0695: Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) • 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA) • 1768: Plan All-Cause Readmissions (PCR) • 1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	*No identified measures

Appendix E2: Related and Competing Measures (narrative format)

Comparison of NQF #1789 and NQF #1768

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1768 Plan All-Cause Readmissions (PCR)

Steward

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

CMS

1768 Plan All-Cause Readmissions (PCR)

NCQA

Description

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

For the hospital-wide readmission (HWR) measure that was previously endorsed and is used in the Hospital Inpatient Quality Reporting Program (IQR), the measure estimates a hospital-level risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology; general medicine; cardiorespiratory; cardiovascular; and neurology, each of which will be described in greater detail below. The measure also indicates the hospital-level standardized risk ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome. CMS annually reports the measure for patients who are 65 years or older, are enrolled in fee-for-service (FFS) Medicare, and hospitalized in non-federal hospitals.

For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP), the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in FFS Medicare and are ACO assigned beneficiaries.

1768 Plan All-Cause Readmissions (PCR)

For patients 18 years of age and older, the number of acute inpatient stays during the measurement year that were followed by an unplanned acute readmission for any diagnosis within 30 days and the predicted probability of an acute readmission. Data are reported in the following categories:

1. Count of Index Hospital Stays* (denominator)
2. Count of 30-Day Readmissions (numerator)
3. Average Adjusted Probability of Readmission

*An acute inpatient stay with a discharge during the first 11 months of the measurement year (e.g., on or between January 1 and December 1).

Type

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Outcome

1768 Plan All-Cause Readmissions (PCR)

Process

Data Source

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Claims

1768 Plan All-Cause Readmissions (PCR)

Instrument-Based Data

Level

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Facility / Integrated Delivery System

1768 Plan All-Cause Readmissions (PCR)

Health Plan / Integrated Delivery System

Setting

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Inpatient/Hospital / Outpatient Services

1768 Plan All-Cause Readmissions (PCR)

Other; This measure does not specify a specific setting where care must be provided.

Numerator Statement

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The outcome for the HWR measure is 30-day readmission. We define readmission as an inpatient admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

The outcome for the ACR measure is also 30-day readmission. The outcome is defined identically to what is described above for the HWR measure.

1768 Plan All-Cause Readmissions (PCR)

At least one acute unplanned readmission for any diagnosis within 30 days of the date of discharge from the Index Hospital Stay, that is on or between the second day of the measurement year and the end of the measurement year.

Numerator Details

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);
2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and
3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

The Planned Readmission Algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

1768 Plan All-Cause Readmissions (PCR)

Step 1: Identify all acute inpatient stays with an admission date on or between the second day of the measurement year and the end of the measurement year (e.g., on or between January 2 and December 31 of the measurement year).

Step 2: Acute-to-acute transfers: Keep the original admission date as the admission date for the Index Hospital Stay, but use the transfer's discharge date as the discharge date for the Index Hospital Stay.

Step 3: Exclude acute inpatient hospital discharges with a principal diagnosis of pregnancy or a principal diagnosis for a condition originating in the perinatal period.

See corresponding Excel document for Pregnancy Value Set

See corresponding Excel document for Perinatal Conditions Value Set

Step 4: For each Index Hospital Stay, determine if any of the acute inpatient stays have an admission date within 30 days after the discharge date for the Index Hospital Stay.

Denominator Statement

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The measure at the hospital level includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US

hospitals (including territories) with a complete claims history for the 12 months prior to admission.

The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals.

1768 Plan All-Cause Readmissions (PCR)

Patients age 18 and older with a discharge from an acute inpatient stay (Index Hospital Stay) on or between January 1 and December 1 of the measurement year.

Denominator Details

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

To be included in the hospital level measure, cohort patients must be:

1. Enrolled in Medicare fee-for-service (FFS) Part A for the 12 months prior to the date of admission and during the index admission;
2. Aged 65 or over;
3. Discharged alive from a non-federal short-term acute care hospital; and
4. Not transferred to another acute care facility.

The ACO version of this measure has the additional criterion that only hospitalizations for ACO-assigned beneficiaries that meet all of the other criteria listed above are included. The cohort definition is otherwise identical to that of the HWR described below.

The measure aggregates the ICD-9 principal diagnosis and all procedure codes of the index admission into clinically coherent groups of conditions and procedures (condition categories or procedure categories) using the AHRQ CCS. There are a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as “other bacterial infections.” There are a total of 231 mutually exclusive procedure categories. Using the AHRQ CCS procedure and condition categories, the measure assigns each index hospitalization to one of five mutually exclusive specialty cohorts: surgery/gynecology, cardiorespiratory, cardiovascular, neurology, and medicine. The rationale behind this organization is that conditions typically cared for by the same team of clinicians are expected to experience similar added (or reduced) levels of readmission risk.

The measure first assigns admissions with qualifying AHRQ procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams.

The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ diagnosis category of the principal discharge diagnosis:

The Cardiorespiratory Cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable and patients are often simultaneously treated for several of these diagnoses.

The Cardiovascular Cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team.

The Neurology Cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team.

The Medicine Cohort includes all non-surgical patients who were not assigned to any of the other cohorts.

1768 Plan All-Cause Readmissions (PCR)

The denominator for this measure is based on acute discharges, not patients.

Step 1: Identify all acute inpatient stays with a discharge date (Index Hospital Stay) during the first 11 months of the measurement year (e.g., on or between January 1 and December 1 of the measurement year).

Step 2: If the discharge is an acute-to-acute transfer, keep the original admission date as the admission date for the Index Hospital Stay, but use the transfer's discharge date as the discharge date for the Index Hospital Stay.

Step 3: Exclude hospital stays where the admission date for the Index Hospital Stay is the same as the discharge date for the Index Hospital Stay.

Step 4: Exclude stays for the following reasons:

- Inpatient stays with discharges for death
- Acute inpatient discharge with a principal diagnosis of pregnancy (See corresponding Excel document for Pregnancy Value Set)
- Acute inpatient discharge with a principal diagnosis of a condition originating in the perinatal period (See corresponding Excel document for Perinatal Conditions Value Set)

Step 5: For all acute inpatient discharges identified using steps 1-4, determine if there was a planned hospital stay within 30 days using all acute inpatient stays. Exclude any acute inpatient discharge as an Index Hospital Stay if the admission date of the first planned hospital stay is within 30 days and includes any of the following.

- A principal diagnosis of maintenance chemotherapy (Chemotherapy Value Set)
- A principal diagnosis of rehabilitation (Rehabilitation Value Set).
- An organ transplant (Kidney Transplant Value Set, Bone Marrow Transplant Value Set, Organ Transplant Other Than Kidney Value Set).
- A potentially planned procedure (Potentially Planned Procedure Value Set) without a principal acute diagnosis (Acute Condition Value Set).

(See corresponding Excel document for the value sets reference above.)

Step 6: Assign each acute inpatient stay to an age category (see S.12 for stratification details).

Exclusions

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The measure excludes index admissions for patients:

1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals;
2. Without at least 30 days post-discharge enrollment in FFS Medicare;
3. Discharged against medical advice (AMA);
4. Admitted for primary psychiatric diagnoses;
5. Admitted for rehabilitation; or

6. Admitted for medical treatment of cancer.

1768 Plan All-Cause Readmissions (PCR)

Exclusions are included in the definition of the denominator (see S.9). Exclusions include discharges for death, pregnancy, prerinatal condition, or a discharge that is followed by a planned admission within 30 days.

Exclusion Details

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1. Admitted to a PPS-exempt cancer hospital, identified by the Medicare provider ID.
2. Admissions without at least 30 days post-discharge enrollment in FFS Medicare are determined using data captured in the Medicare Enrollment Database (EDB).
3. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.
4. Admitted for primary psychiatric disease, identified by a principal diagnosis in one of the specific AHRQ CCS categories listed in the attached data dictionary.
5. Admitted for rehabilitation care, identified by the specific ICD-9 diagnosis codes included in CCS 254 (Rehabilitation care; fitting of prostheses; and adjustment of devices).
6. Admitted for medical treatment of cancer, identified by the specific AHRQ CCS categories listed in the attached data dictionary.

1768 Plan All-Cause Readmissions (PCR)

- Inpatient stays with discharges for death
 - Acute inpatient discharge with a principal diagnosis of pregnancy (See corresponding Excel document for Pregnancy Value Set)
 - Acute inpatient discharge with a principal diagnosis of a condition originating in the perinatal period (See corresponding Excel document for Perinatal Conditions Value Set)
 - Admission followed by a planned readmission: Any acute inpatient discharge with a readmission within 30 days for maintenance chemotherapy (Chemotherapy Value Set), rehabilitation (Rehabilitation Value Set), organ transplant (Kidney Transplant Value Set, Bone Marrow Transplant Value Set, Organ Transplant Other Than Kidney Value Set), or a potentially planned procedure (Potentially Planned Procedure Value Set) without a principal acute diagnosis (Acute Condition Value Set).
- (See corresponding Excel document for the value sets above)

Risk Adjustment

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Statistical risk model

1768 Plan All-Cause Readmissions (PCR)

Stratification by risk category/subgroup

Stratification

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

N/A

1768 Plan All-Cause Readmissions (PCR)

The measure reported by age categories. The age stratifications are: 18-44, 45-54, 55-64, 65-74, 75-84, 85+, Total

RISK STRATIFICATION CATEGORIES

For each index hospital stay, use the following steps to identify risk adjustment categories based on presence of surgeries, discharge condition, comorbidity, age and gender. Tables to classify conditions based on the CMS HCC model are available at www.ncqa.org.

SURGERIES: Determine if the patient underwent surgery during the inpatient stay.

Download the list of codes from the NCQA Web site www.ncqa.org (Table HCC-Surg) and use it to identify surgeries. Consider an index hospital stay to include a surgery if at least one procedure code in Table HCC-Surg is present from any provider between the admission and discharge dates.

DISCHARGE CONDITION: Assign a discharge Clinical Condition (CC) category code to the index hospital stay based on its primary discharge diagnosis, using Table PCR-DischCC (available at www.ncqa.org). For acute-to-acute transfers, use the transfer's primary discharge diagnosis. Exclude diagnoses that cannot be mapped to Table PCR-DischCC.

COMORBIDITIES:

STEP 1: Identify all diagnoses for encounters during the classification period. Include the following when identifying encounters: (Exclude the primary discharge diagnosis on the Index Hospital Stay)

- Outpatient visits (See corresponding excel document Outpatient Value Set).
- Observation visits (See corresponding excel document Observation Value Set).
- Nonacute inpatient encounters (See corresponding excel document Nonacute Inpatient Value Set).
- Acute inpatient encounters (See corresponding excel document Acute Inpatient Value Set).
- ED visits (See corresponding excel document ED Value Set).

STEP 2: Assign each diagnosis to one comorbid Clinical Condition (CC) category using Table CC—Comorbid (available at www.ncqa.org). Exclude all diagnoses that cannot be assigned to a comorbid CC category. For patients with no qualifying diagnoses from face-to-face encounters, skip to the Risk Adjustment Weighting section. All digits must match exactly when mapping diagnosis codes to the comorbid CCs.

STEP 3: Determine HCCs for each comorbid CC identified. Refer to Table HCC—Rank (available at www.ncqa.org). For each stay's comorbid CC list, match the comorbid CC code to the comorbid CC code in the table, and assign: the ranking group, the rank and the HCC. For comorbid CCs that do not match to Table HCC—Rank, use the comorbid CC as the HCC and assign a rank of 1. Note, one comorbid CC can map to multiple HCCs; each HCC can have one or more comorbid CCs.

STEP 4: Assess each ranking group separately and select only the highest ranked HCC in each ranking group using the Rank column (1 is the highest rank possible). Drop all other HCCs in each ranking group, and de-duplicate the HCC list if necessary.

STEP 5: Identify combination HCCs listed in Table HCC—Comb (available at www.ncqa.org). Some combinations suggest a greater amount of risk when observed together. For example, when diabetes and CHF are present, an increased amount of risk is evident.

Additional HCCs are selected to account for these relationships. Compare each stay's list of unique HCCs to those in the HCC column in Table HCC—Comb and assign any additional HCC conditions. For fully nested combinations (e.g., the diabetes/CHF combination is nested in the diabetes/ CHF/renal combination), use only the more comprehensive pattern. In this example, only the diabetes/CHF/renal combination is counted. For overlapping combinations (e.g., the CHF, COPD combination overlaps the CHF/renal/diabetes combination), use both sets of combinations. In this example, both CHF/COPD and CHF/renal/diabetes combinations are counted. Based on the combinations, a member can have none, one or more of these added HCCs.

Type Score

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Rate/proportion

1768 Plan All-Cause Readmissions (PCR)

Other; Rate/Proportion and Count: The Counts are the number of index hospital stays (denominator) and stays with a subsequent 30-day readmission (numerator). The Rate/Proportions are the average adjusted probability of readmission (expected rate) and the observed rate of readmission (numerator / denominator).

Algorithm

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

This measure estimates a hospital-level 30-day all-cause RSRR using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient, and hospital levels to account for variance in patient outcomes within and between hospitals (Normand et al., 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge using age, selected clinical covariates, and a hospital -specific effect. At the hospital level, the approach models the hospital- specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of a readmission, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand et al., 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the standardized readmission ratio (SRR) is calculated as the ratio of the number of “predicted” readmissions to the number of “expected” readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted based on the hospital’s performance with its observed case mix and service mix, and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix and service mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows a particular hospital’s performance, given its case mix and service mix, to be compared to an average hospital’s performance with the same case mix and service mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality.

For each specialty cohort, the “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors (found in Table D.9) and the hospital-specific effect on the risk of readmission. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are log transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are log transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the data in that period.

The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide composite SRR. The composite SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in Appendix A and in the original methodology report (Horwitz et al., 2012).

The ACR quality measure was adapted from the HWR quality measure. The unit of analysis was changed from the hospital to the ACO. This was possible because both the HWR and ACR measures assess readmission performance for a population that clusters patients together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions are excluded for the ACR quality measure in the same way that they are excluded for the HWR measure. The ACR measure is calculated identically to what is described above for the HWR measure.

1768 Plan All-Cause Readmissions (PCR)

Look at denominator details, numerator details and the risk adjustment methodology for the measure logic in sections S.6, S.9, S.12 and S.14.

CALCULATE THE OBSERVED RATE OF READMISSION

Step 1: Determine the eligible population: Patients ages 18+ as of the discharge date for the Index Hospital Stay.

Step 2: Determine number discharges meeting the denominator criteria as specified in Section S.9 above.

Step 3: Stratify the denominator by age and gender categories as specified in Section S.12 above.

Step 4: Determine the number of patients who meet the numerator criteria as specified in section S.6 above.

Step 5: Calculate the Observed Rate of Readmission as Numerator/Denominator for each age/gender category.

CALCULATE THE EXPECTED RATE OF READMISSION

STEP 1: For each index hospital stay in the denominator identify risk adjustment categories based on presence of surgeries, discharge condition, comorbidity, age and gender as specified in Section S.12 above.

STEP 2: For each index hospital stay in the denominator identify risk adjustment weights based on risk adjustment categories defined in step 1. See Section S.14 for full details.

STEP 3: Use the formula below to calculate the adjusted probability of a readmission based on the sum of the weights for each index hospital stay. Adjusted probability of readmission = $[\exp(\text{sum of weights for index hospital stay})] / [1 + \exp(\text{sum of weights for index hospital stay})]$] Note: “Exp” refers to the exponential or antilog function. This is the Expected Rate of Readmission

CALCULATE THE OBSERVED/EXPECTED RATIO

STEP 1: Calculate the ratio: Observed Rate or Readmissions/Expected Rate of Readmissions

Submission items

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

- 0329: Risk-Adjusted 30-Day All-Cause Readmission Rate
- 0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization
- 0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.
- 0506: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
- 0695: Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)
- 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)
- 1768: Plan All-Cause Readmissions (PCR)
- 1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

1768 Plan All-Cause Readmissions (PCR)

*No identified measures

Appendix F: Pre-Evaluation Comments

Comments received as of June 20, 2018.

1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Submitted by American Medical Association (AMA)

The American Medical Association (AMA) would like to ask the Standing Committee to thoughtfully consider whether there is increased risk for negative unintended consequences related to a potential association of increased in patient mortality following the implementation of the Center for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program (HRRP). Following the publication by Gupta and colleagues (2017), the AMA completed a literature search to evaluate whether the conclusions of Gupta and co-authors could be replicated. This scan was conducted to better understand the significance of the authors' findings within the larger body of literature on readmissions. While the results were inconclusive due to the various studies using inconsistent data and implementing different versions of the CMS readmission measures, the review raised additional questions that the AMA believes are important to explore. As a result, the AMA sent a letter to CMS in February and plan to reiterate in our 2019 IPPS proposed rule comments outlining a set of questions that should be investigated to assist CMS, physicians, providers and patients better understand the impact our actions on readmissions and outcomes. These questions were:

- 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. 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 not 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 are based on and 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 we be introducing?
- 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 colleagues 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.

In addition, there is emerging evidence questioning the validity of the timeframe of this measure—30-day post-discharge. According to a recent study in the *Annals of Internal Medicine* (Graham, 2017), the preventability of readmissions might change over the post discharge time frame. As the authors highlight, readmissions within 7 days of discharge differ from those between 8 and 30 days after discharge with respect to preventability. Early readmissions were more likely to be preventable and amenable to hospital-based interventions. Late readmissions were less likely to be preventable and were more amenable to ambulatory and home-based interventions. Therefore, post-7-days discharge there are potentially little influence a hospital has over a patient being readmitted to a hospital.

Regarding the expansion of this measure to apply to Accountable Care Organizations (ACOs), we note that the evidence provided in 1A focuses solely on the inpatient setting and does not yet address the underlying evidence support expansion to ACOs. In addition, it would be useful to better understand the composition of the various ACOs used in 1b. Opportunity for Improvement and for the testing results provided under Criteria 2. Inclusion of specific entities such as a hospital or physician practice are not required by the Medicare Shared Savings or Pioneer ACO Programs and it would be useful to understand whether performance rates and reliability and validity results are influenced by which entities participated in the ACOs. We also remain disappointed to see that the variables used for social risk factors have not yet been expanded to other critical aspects such as access to transportation and pharmacies.

We respectfully request that the Standing Committee discuss the implications of the articles noted and the research questions we posed to CMS around the impact that the implementation of readmissions measures such as this one has had on patient mortality and the questions related to the expansion to ACOs during the review of this measure.

References:

Dharmarajan, Wang, Lin, et al. Association of Changing Hospital Readmission Rates With Mortality Rates After Hospital Discharge. *JAMA*. 2017;318:270-278.

Graham, Auerbach, Schnipper, et al. Preventability of Early Versus Late Hospital Readmissions in a National Cohort of General Medicine Patients. *Ann Int Med*. 2018. doi:10.7326/M17-1724 . Published online May 1, 2018.

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1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Submitted by Federation of American Hospitals (FAH)

The Federation of American Hospitals (FAH) appreciates the opportunity to comment on the expansion of Measure #1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) to Accountable Care Organizations (ACOs). We note that the evidence review provided is solely focused on studies demonstrating a link between processes that can drive reductions in readmissions limited to the inpatient setting. We would expect to see this review broadened to include processes that can drive reductions in readmission beyond the inpatient setting to include ACOs or other integrated delivery systems. In addition, FAH requests that the Standing Committee consider the recently published article, which identified that interventions by the hospital are more likely to prevent readmissions within the first week after discharge and those that occur in the remaining 30 days post-discharge were more responsive when provided by outpatient clinics (Graham, 2018). While this is just one study, it leads us to question the strength of evidence supporting the 30-day timeframe, which may be more appropriate for ACOs and less for hospitals.

FAH would like to again reiterate our disappointment in the minimal set of variables used to test whether social risk factors should be included in the risk adjustment model. As experience is gained and additional factors are available such as information on access to transportation or pharmacies, level of education and other relevant data, we hope to see further analysis and testing be completed in the near future.

Reference:

Graham, Auerbach, Schnipper, et al. Preventability of Early Versus Late Hospital Readmissions in a National Cohort of General Medicine Patients. *Ann Int Med.* 2018. doi:10.7326/M17-1724 . Published online May 1, 2018.

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