Template

Peer Reviewed Journal Article Requirement

Section 101(c)(1) of the MACRA requires submission of new measures for publication in applicable specialty-appropriate, peer-reviewed journals prior to implementing in MIPS. These measures will be submitted by CMS, to a journal(s) before including any new measure in the final list of annual clinical quality measures (CQM) under MIPS. The measure owner shall provide the required information for article submission under the MACRA per CMS “Call for Measures” submission process.

Measure owners submitting measures into JIRA must complete the required information by the Call for Measures deadline. Some of the information requested below may be listed in specific fields in the JIRA tool; however, to ensure that CMS has all of the necessary information and to avoid delays in the evaluation of your submission, please fully complete this form as an attached Word document in JIRA. The information in JIRA must be consistent with the information below. This includes, but is not limited to:

***Clinician Group Hospital-wide All-cause Unplanned Readmission Measure***

**Measure Owner:** *Centers for Medicare & Medicaid Services*

**Measure Developer:** *Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation*

**Description:** This measure is a re-specified version of the measure, “risk-adjusted readmission rate (RARR) of unplanned readmission within 30 days of hospital discharge for any condition” (NQF 1789), which was developed for patients 65 years and older using Medicare claims. This re-specified measure attributes outcomes to MIPS participating clinician groups and assesses each group’s readmission rate. The measure comprises a single summary score, derived from the results of 5 models, 1 for each of the following specialty cohorts (groups of discharge condition categories [CC] or procedure categories): medicine, surgery/gynecology, cardiorespiratory, cardiovascular, and neurology.

1. **Statement**

* *Background (Why is this measure important?)*
* *Environmental Scan (Are there existing measures in this area?)*

Readmission after discharge has been recognized for over a decade as both a quality and a resource concern. Jencks et. al. estimated that readmissions within 30 days of discharge cost Medicare more than $17 billion annually.1 A 2006 Commonwealth Fund report estimated if national readmission rates were lowered to the levels achieved by the top-performing regions, Medicare would save $1.9 billion annually.2 Consequently, there has been a national effort to address rates of readmission for patients of all ages and conditions. As a part of this effort, the Centers for Medicare and Medicaid Services (CMS) publicly reports risk-standardized hospital-wide, all-cause readmission rates using a measure which includes most hospital discharges.3-4

The existing hospital wide readmission (HWR) measure, which provides a broad assessment of the quality of care at hospitals, reflects in part the quality of clinician care in the hospital, in that inpatient clinicians are integral to inpatient care and the transition to an outpatient setting. At the same time, this measure may also reflect the quality of outpatient care, in that outpatient clinicians may influence whether patients return to an acute care setting. This suggests that it would be useful to implement and report a readmission measure which attributes readmission outcomes to groups of these clinicians, rather than the hospital from which the patient is discharged. For this reason, CMS has proposed reporting a hospital-wide, all-cause readmission measure for use in assessing the quality of clinician group care that is adapted from the existing HWR measure. The adapted measure is intended for use in MIPS, part of the Quality Payment Program, to assess the performance of eligible clinician (EC) groups. Though there is currently a version of the hospital-level HWR measure in use under MIPS, it does not attribute the outcome to inpatient clinicians.

1. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med. 2009;360(14):1418-1428.

2. Schoen C, How S. The Commonwealth Fund Commission on a High Performance Health System, Why Not the Best? Results from a National Scorecard on U.S. Health System Performance. The Commonwealth Fund. Sept 2006.

3. Simoes J, Grady JN, DeBuhr J, et al. 2017 All-Cause Hospital-Wide Measure Updates and Specifications Report; Version 6.0. Mar 2017; https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1228774371008.

4. Horwitz LI, Partovian C, Lin Z, Grady JN, Herrin J, Conover M, Montague J, Dillaway C, Bartczak K, Suter LG, Ross JS, Bernheim SM, Krumholz HM, Drye EE. Development and use of an administrative claims measure for profiling hospital-wide performance on 30-day unplanned readmission. Ann Intern Med. 2014 Nov 18;161(10 Suppl):S66-75. doi: 10.7326/M13-3000.

1. **Gap Analysis**

* *Provide Evidence for the Measure (What are the gaps and opportunities to improve care?)*
* *Expected Outcome (Patient care/patient health improvements, cost savings)*
* *Recommendation for the Measure (Is it based on a study, consensus opinion, USPSTF recommendation etc.?)*

Hospital readmission, for any reason, is disruptive to patients and caregivers, costly to the healthcare system, and puts patients at additional risk of hospital-acquired infections and complications. Readmissions are also a major source of patient and family stress and may contribute substantially to loss of functional ability, particularly in older patients. Some readmissions are unavoidable and result from inevitable progression of disease or worsening of chronic conditions. However, readmissions may also result from poor quality of care or inadequate transitional or post-discharge care.

Transitional care includes effective discharge planning, transfer of information at the time of discharge, patient assessment and education, and coordination of care and monitoring in the post-discharge period. Numerous studies have found an association between quality of inpatient or transitional care and early (typically 30-day) readmission rates for a wide range of conditions.1-8 Randomized controlled trials have shown that improvement in the following areas can directly reduce readmission rates: quality of care during the initial admission; improvement in communication with patients, their caregivers, and their clinicians; patient education; pre-discharge assessment; and coordination of care after discharge.9-17 Successful randomized trials have reduced 30-day readmission rates by 20-40%.18 Widespread application of these clinical trial interventions to general practice has also been encouraging. Since 2008, Medicare Quality Improvement Organizations have been funded to focus on care transitions by applying lessons learned from clinical trials.14 Several have been notably successful in reducing readmissions within 30 days.19 Many of these study interventions involved enhanced clinician involvement and indicate a key role for clinicians in reducing readmissions.9-17

Despite these demonstrated successful interventions, the overall national readmission rate remains high, with a within 30-day readmission following discharge of over 15%.20 Moreover, we show that Risk Adjusted Readmission Rate s (RARRs) range from 7% to 25% for EC groups for 2015-16. Both the high baseline rate and the variability across providers speak to the need for a quality measure to prompt greater care improvement. Given that studies have shown readmissions within 30 days to be related to quality of care, that interventions, including those utilizing clinicians, have been able to reduce 30-day readmission rates for a variety of specific conditions, and that high and variable clinician-level readmission rates indicate opportunity for improvement, we sought to develop measure of all-cause, all-condition 30-day unplanned readmission at the clinician group level.

References:

* 1. Frankl SE, Breeling JL, L. G. Preventability of emergent hospital readmission American Journal of Medicine. Jun 1991;90(6):667-674.
  2. Corrigan J, Martin J. Identification of factors associated with hospital readmission and development of a predictive model. Health Services Research. Apr 1992;27(1):81-101.
  3. Oddone E, Weinberger M, Horner M, et al. Classifying general medicine readmissions. Are they preventable? Veterans Affairs Cooperative Studies in Health Services Group on Primary Care and Hospital Readmissions. Journal of General Internal Medicine. Oct 1996;11(10):597-607.
  4. Ashton C, Del Junco DJ, Souchek J, Wray N, Mansyur C. The association between the quality of inpatient care and early readmission: a meta-analysis of the evidence. Med Care. Oct 1997;35(10):1044-1059.
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  6. Courtney EDJ, Ankrett S, McCollum PT. 28-Day emergency surgical re-admission rates asa clinical indicator of performance. Annals of the Royal College of Surgeons of England. Mar 2003;85(2):75-78.
  7. Halfon P, Eggli Y, Pr, et al. Validation of the potentially avoidable hospital readmission rate as a routine indicator of the quality of hospital care. Medical Care. Nov 2006;44(11):972-981.
  8. Hernandez AF, Greiner MA, Fonarow GC, et al. Relationship between early physician follow-up and 30-day readmission among Medicare beneficiaries hospitalized for heart failure. JAMA. May 5, 2010;303(17):1716-1722.
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  10. Naylor MD, Brooten D, Campbell R, et al. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized clinical trial. JAMA. 1999;281(7):613-620.
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  13. Conley RR, Kelly DL, Love RC, McMahon RP. Rehospitalization risk with second-generation and depot antipsychotics. Annals of Clinical Psychiatry. Mar2003;15(1):23-31.
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  15. Phillips CO, Wright SM, Kern DE, Singa RM, Shepperd S, Rubin HR. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis. JAMA. Mar 17, 2004;291(11):1358-1367.
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1. **Reliability/Validity**
2. *What testing has been performed at the clinician level? Please provide testing results including the N value, Bonnie test case results, correlation coefficient and any other pertinent information or values to be considered.*

* Reliability Testing Results:
* Validity Testing Results, clinician sites:
* *Exclusion frequency:*

1. *What were the minimum sample sizes used for reliability results?* **Other Information**

* *Is it risk adjusted? If so, how?*
* *What benchmarking information is available?*

The provider-level reliability for EC groups was estimated using “unit” reliability, that is, the reliability with which individual units (here, EC groups) are measured. This is because the reliability of any one entity’s measure score will vary depending on the number of index admissions attributed. Entities with higher volume will tend to have more reliable scores, while those with lower volume will tend to have less reliable scores. Specifically, we use the formula presented by Adams et al1, to calculate provider-level signal-to-noise reliability. For each measured entity (EC group) the ratio of between entity variance (signal) to total variance (noise) was calculated. The distribution of these values for each of the five specialty cohorts and all entities with at least 25 attributed index admissions in the cohort are summarized below.

Clinician Group Level Reliability/Measure Score Reliability Results

Mean signal to noise ratio at clinical group level

Cardiorespiratory Neurology Medicine Cardiovascular Surgical Average

Mean 0.55 0.65 0.47 0.57 0.45 0.54

The mean signal-to-noise reliability scores of the five cohorts ranged from 0.45 to 0.65 for EC groups, calculated with 1 year of data and providers with at least 25 patients in the cohorts, are considered “substantial” for clinician groups based on the standards established by Landis and Koch (1977). 2

Measure validity was demonstrated through empirical validity testing, by systematic assessment of measure face validity via a technical expert panel (TEP) of national experts and stakeholder organizations, and through use of established measure development guidelines.3-8

Empirical Validity Testing

To provide additional validation of the measure, correlation was assessed between the measure and metrics of hospital quality. Since the outcome depends on hospital processes, including coordination of care during the stay and during transition from the hospital, the readmission rate for a provider should be consistent with the quality of the hospital where most of their attributed patients are discharged. As measures of hospital quality, the CMS Hospital Overall Star Ratings and Hospital Star Ratings readmission domain scores were used. To assess consistency, the distribution of the measure score was plotted, Risk Adjusted Readmission Rate (RARR) over: a) Overall Star Rating (1-5) and b) quintiles of the Star Rating Readmission domain score. We did this for all EC Groups with at least 25 patients attributed.

Validity as Assessed by External Groups and TEP

Throughout the measure development process, expert and stakeholder input was solicited through holding regular discussions with external clinical consultants, consulting our national TEP, and holding a 30-day public comment period.

In addition to the clinical consultations and in alignment with CMS MMS guidance, a TEP was convened to provide input and feedback during measure development from a group of recognized experts in relevant fields. Three structured TEP conference calls consisting of a presentation of key issues, proposed approach, and relevant data, followed by open discussion among TEP members were held. The measure was modified to the measure attribution based on TEP feedback on the measure.

Validity Indicated by Established Measure Development Guidelines

This measure was developed in consultation with national guidelines for publicly reported outcome measures, with input from outside experts and the public. The measure is consistent with the technical approach to outcomes measurement set forth in NQF guidance for outcome measures9, CMS Measure Management System (MMS) guidance, and guidance articulated in the American Heart Association scientific statement entitled, “Standards for Statistical Models Used for Public Reporting of Health Outcomes”.10

Topped-Out Analysis

The HWR measure is not “topped out” at any volume or attribution level. For the HWR measure, we ran split half (test-retest) reliability testing in addition to signal to noise testing. A split half reliability of 0.40 or higher is considered acceptable. At that level, EC group reporting at a volume threshold of 100 admissions would meet this reliability target.

Summary of “Topped-Out” Status for MIPS HWR Measure (2015-2016 period)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Provider** | **Volume Cutoff** | **N** | **75th Percentile** | **90th Percentile** | **Standard Error** | **75th and 90th percentiles within 2 standard errors of each other (or 10th and 25th percentiles, for inverse measures)** | **Truncated Mean** | **Truncated SD** | **Truncated Coefficient of Variation (TCV)** | **Truncated Coefficient of Variation less than 0.10** | **Topped Out** | **Signal to Noise Reliability** | **Split Half (Test-Retest) Reliability** |
| Eligible Clinician Group | 25 | 55593 | 16.1944 | 17.0838 | 0.006 | No | 15.39 | 0.99 | 0.064 | Yes | No | 0.996 | 0.3 |
| Eligible Clinician Group | 50 | 37443 | 16.2956 | 17.2236 | 0.008 | No | 15.39 | 1.09 | 0.071 | Yes | No | 0.996 | 0.34 |
| Eligible Clinician Group | 100 | 20863 | 16.3725 | 17.3587 | 0.011 | No | 15.38 | 1.18 | 0.077 | Yes | No | 0.997 | 0.4 |
| Eligible Clinician Group | 200 | 10096 | 16.3995 | 17.3974 | 0.016 | No | 15.35 | 1.23 | 0.080 | Yes | No | 0.998 | 0.49 |

Risk Adjustment

The goal of risk adjustment is to account for differences across hospitals in patient demographic and clinical characteristics that might be related to the outcome but are unrelated to quality of care. Risk adjustment for this measure is complicated by the fact that it includes many different principal discharge diagnosis condition categories. For this measure, therefore adjustment for both case mix differences (clinical status of the patient, accounted for by adjusting for comorbidities) and service mix differences (the types of conditions/procedures, accounted for by adjusting for the principal discharge diagnosis condition category) is needed. In keeping with alignment with the hospital-level measure, and because the hospital-level risk model was developed and validated at the patient level using the same cohort adopted for MIPS HWR measure, this measure uses the same risk factors as used by the HWR model.

Consistent with the original hospital-level HWR measure, this measure does not adjust for social risk factors but does adjust for age and clinical characteristics in order to illuminate important quality differences. The hospital-level HWR measure was re-endorsed by the National Quality Forum (NQF) without adjustment for patient-level SES factors. For more information about the omission of social risk factors, please refer to the NQF website.

Because MIPS HWR measure assigns each admission to multiple eligible clinicians, the hierarchical logistic regression methods of the HWR to adjust for differences in eligible clinician case mix and to account for the clustering of patients within a provider could not be used. Instead, the measure relies a method which uses the results of each specialty cohort model to construct a standardized readmission ratio (SRR) for each EC group, which is then adjusted for clustering. Each cohort model adjusts for case mix differences among providers by risk adjusting for patients’ comorbid conditions identified in inpatient episodes of care for the 12 months prior to the index admission as well as those present at admission. Diagnoses that may have been a complication of care during the index admission are not risk adjusted for. CMS-CCs, the grouper used in previous CMS risk-standardized outcome measures, were used to define the comorbid risk adjusters and used a fixed set of comorbid risk variables across models. Service mix differences among eligible clinicians within each specialty cohort were risk adjusted for by including indicator variables for principal discharge diagnosis condition categories (as defined by AHRQ CCS) in each model.

Finally, each of the five specialty cohort models were used to calculate the ratio of observed to expected numbers of readmissions for each EC group in each specialty cohort. These standardized readmission ratios (SRRs) are then used to estimate the between provider variance, and this parameter is then used to adjust each SRR, creating a ‘smoothed rate’ (SR). A single summary score is calculated from the five specialty cohort smoothed rates by taking the volume-weighted log average (that is, the geometric mean) of the rates multiplying the resulting ratio by the average national observed readmission rate. This approach allowed us to take into account the variation in specialty cohort mix across EC groups.

Service-mix Grouping

All AHRQ CCSs with sufficient volume (defined as those with more than 1,000 admissions nationally each year) were included as a condition-specific indicator in the model. Condition categories differ in their baseline readmission risks and EC groups will differ in their relative distribution of these condition categories (service mix) within each specialty cohort. Therefore, adjusting for condition categories levels the playing field across EC groups with different service mixes. This was to align with the hospital-level HWR measure.

Complications of Admission

Complications occurring during admission which are not comorbid illnesses may reflect clinician quality of care, and therefore should not be used for risk adjustment. Although adverse events during admission may increase the risk of readmission, including them as covariates in a risk-adjusted model could attenuate the measure’s ability to characterize the quality of care delivered by EC groups. The previously vetted approach from the hospital-level HWR measure to classify CMS-CCs that are plausibly complications of care were used and augmented.

Case-mix Adjustment: Comorbid Risk Variables

CMS-CCs were used to group ICD-9-CM/ICD-10-CM codes into comorbid risk adjustment variables. Multiple CMS condition-specific claims-based readmission models that use this grouper method to define variables for risk adjustment have been validated against models that use medical record-abstracted data for risk adjustment.[11-13](#_ENREF_23)

We have not established any benchmarks for this measure. For MIPS quality measures, CMS establishes benchmarks using historical data and displays them in terms of deciles.14

References

1. Adams J, Mehrota, A, Thoman J, McGlynn, E. (2010). Physician cost profiling – reliability and risk of misclassification. NEJM, 362(11): 1014-1021.
2. Landis J, Koch G, The measurement of observer agreement for categorical data. Biometrics 1977; 33:159-174.
3. Krumholz HM, Wang Y, Mattera JA, et al. An administrative claims model suitable for profiling hospital performance based on 30-day mortality rates among patients with an acute myocardial infarction. Circulation. 2006 Apr 4; 113(13):1683-92.
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14. 2019 MIPS quality measure benchmarking: https://qpp-cm-prod-content.s3.amazonaws.com/uploads/342/2019%20MIPS%20Quality%20Benchmarks.zip
15. **Endorsement**

* *Provide NQF endorsement status (and ID) and/or other endorsing body (If measure is only endorsed for paper records, please note endorsement for only the data source being submitted)*

This measure has been submitted to NQF for initial endorsement.

1. **Summary**

* *Alignment with CMS Quality Strategy or MACRA (If applicable)*
* *Importance to MIPS or other CMS programs*
* *Rationale: Use of measure for inclusion in program (specialty society, regional collaborative, other)*
* *Public reporting (if applicable)*
* *Preferable relevant Peer-Review Journal for publication*

This measure has been developed for use in the CMS MACRA program, with EC groups used for development and testing. Public comment generally supported this use, and the public reporting of the corresponding hospital measure provides a context for public reporting of this measure. Journals which should be considered for publication include JAMA IM, Annals of Internal Medicine, Medical Care, Health Services Research.