NATIONAL QUALITY FORUM
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Memo

June 29-30, 2021

To: Consensus Standards Approval Committee (CSAC)

From: All-Cause Admissions and Readmissions Project Team

Re: All-Cause Admissions and Readmissions Fall 2020

CSAC Action Required

The CSAC will review recommendations from the All-Cause Admissions and Readmissions project at its June 29-30th, 2021 meeting and vote on whether to uphold the recommendations from the Standing Committee.

This memo includes a summary of the project, measure recommendations, themes identified and responses to the public and member comments and the results from the NQF member expression of support. The following documents accompany this memo:

1. **All-Cause Admissions and Readmissions Fall 2020 Draft Report**. The draft report has been updated to reflect the changes made following the Standing Committee's discussion of public and member comments. The complete draft report and supplemental materials are available on the project webpage.
2. **Comment Table**. Staff has identified themes within the comments received. This table lists 15 comments received during the post-meeting comment period and the NQF/Standing Committee responses.

Background

The National Quality Forum (NQF) has actively worked to endorse healthcare quality performance measures to reduce avoidable admissions and readmissions. Funded by the Centers for Medicare & Medicaid Services (CMS), the NQF-convened Measure Applications Partnership (MAP) has stressed the importance of measures addressing avoidable admissions and readmissions when it recommends measures for use in federal quality initiative programs. The MAP has stressed that measures of readmissions should be part of a suite of measures promoting shared accountability across the healthcare system.

The All-Cause Admissions and Readmissions Standing Committee oversees the NQF All-Cause Admissions and Readmissions measure portfolio. On February 12 and 16, 2021, the 24-member Standing Committee evaluated one newly submitted measure and six measures undergoing maintenance review.

For this project, the Committee evaluated seven measures including six undergoing maintenance endorsement consideration and one new measure against the National Quality Forum's (NQF) evaluation criteria.

The Standing Committee recommended all seven measures for endorsement:

- **NQF #2888** ACO Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions (MCC) (Yale CORE / CMS)
- **NQF #3597** Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions (MCC) Under MIPS (Yale CORE / CMS)
- **NQF #0330** Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization (Yale CORE / CMS)
- **NQF #0505** Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization (Yale CORE / CMS)
- **NQF #0506** Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization (Yale CORE / CMS)
- **NQF #1891** Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization (Yale CORE / CMS)
- **NQF #2515** Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery (Yale CORE / CMS)

Draft Report

The All-Cause Admissions and Readmissions Fall 2020 draft report presents the results of the evaluation of seven measures considered under the Consensus Development Process (CDP). Seven measures are recommended for endorsement.

The measures were evaluated against the 2019 version of the measure evaluation criteria.

Measures	Maintenance	New	Total
Measures under review	6	1	7
Measures recommended for endorsement	6	1	7
Measures not recommended for endorsement	0	0	0
Reasons for not recommending	Importance – 0 Scientific Acceptability -0 Use - 0 Overall - 0 Competing Measure – 0	Importance – 0 Scientific Acceptability - 0 Use - 0 Overall - 0 Competing Measure – 0	0

CSAC Action Required

Pursuant to the CDP, the CSAC is asked to consider endorsement of seven candidate consensus measures.

Measures Recommended for Endorsement

- **NQF #2888** ACO Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions (MCC) (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[21]; No-[0]

- **NQF #3597** Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions (MCC) Under MIPS (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[17]; No-[2]

- **NQF #0330** Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[16]; No-[0]

- **NQF #0505** Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[14]; No-[2]

- **NQF #0506** Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[16]; No-[1]

- **NQF #1891** Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[17]; No-[1]

- **NQF #2515** Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery (Yale CORE / CMS)

Overall Suitability for Endorsement: Yes-[18]; No-[1]

Comments and Their Disposition

NQF received 15 comments from two member organizations pertaining to the draft report and to the measures under review.

A table of comments submitted during the comment period, with the responses to each comment and the actions taken by the Standing Committee and measure developers, is posted to the All-Cause Admissions and Readmissions project webpage.

Comment Themes and Committee Responses

Comments about specific measure specifications and rationale were forwarded to the developers, who were invited to respond.

The Standing Committee reviewed all of the submitted comments (general and measure specific) and developer responses. Committee members focused their discussion on measures or topic areas with the most significant and recurring issues.

Themed Comments

Three major themes were identified in the post-evaluation comments, as follows:

1. Reliability and Minimum Reliability Thresholds
2. Social Risk and Risk Adjustment
3. Opportunity for Improvement

Theme 1 – RELIABILITY/MINIMUM RELIABILITY THRESHOLDS

Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.

Committee Response

Thank you for your comments. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing. The Standing Committee reviewed this information during the measure evaluation meetings and voted to recommend these measures for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on the measures.

Developer Response

In setting a minimum reliability threshold, CMS needs to balance measure reliability with the statutory requirement to make performance measures applicable to the broadest number of providers. Measure reliability is driven by the outcome rate, minimum volume of patients, and the variation in outcome rates across providers. CMS typically sets a minimum reliability threshold of 0.4 in the MIPS program for these reasons. The minimum volume of patients and minimum number of providers per group is typically set by CMS during the process of rulemaking. With the minimum sample size of 18 MCC patients and a group size of greater than 15 clinicians per practice, mean reliability was 0.809, with a median of 0.873, IQR of 0.683 to 0.961, and a range from 0.413 to 0.999, which corresponds to adequate reliability.

In the testing attachment for the measures, we provided both split sample and signal-to-noise reliability. Both the split-sample reliability and signal-to noise reliability results indicate sufficient measure score reliability.

As a metric of agreement, we calculated the ICC for hospitals with 25 admissions or more. Using the Spearman-Brown prediction formula,

- [#0505] the agreement between the two independent assessments of the RSRR for each hospital was 0.424.
- [#0506] the agreement between the two independent assessments of the RSRR for each hospital was 0.544.
- [#1891] the agreement between the two independent assessments of the RSRR for each hospital was 0.406.
- [#2515] the agreement between the two independent assessments of the RSRR for each hospital was 0.436.

We also calculated the signal-to-noise reliability score for each hospital with at least 25 admissions.

- [#0505] The median reliability score was 0.51, ranging from 0.14 to 0.91. The 25th and 75th percentiles were 0.33 and 0.66, respectively.
- [#0506] The median reliability score was 0.56, ranging from 0.13 to 0.96. The 25th and 75th percentiles were 0.34 and 0.73, respectively.
- [#1891] The median reliability score was 0.43, ranging from 0.11 to 0.90. The 25th and 75th percentiles were 0.25 and 0.60, respectively.
- [#2515] The median reliability score was 0.60, ranging from 0.27 to 0.92. The 25th and 75th percentiles were 0.45 and 0.71, respectively.

The median reliability scores demonstrate moderate reliability.

Theme 2 – SOCIAL RISK AND RISK ADJUSTMENT

Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

Committee Response

Thank you for your comments. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including risk adjustment modeling and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed this information during the measure evaluation meetings and voted to recommend these measures for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on the measures.

Developer Response

Social Risk

While there is a conceptual pathway by which patients with social risk factors could experience worse outcomes, the empiric evidence, and CMS's policy decision to adjust the measure at the payment/program level, do not support risk adjustment at the hospital level.

In our testing attachment we provided analyses showing that adjustment for social risk factors (dual eligibility and low AHRQ SES) did not have an appreciable impact on hospital measure scores: differences between adjusted and unadjusted measures scores were small, and correlations between adjusted and unadjusted measure scores were near 1. This suggests that existing clinical risk factors capture much of the risk related to social risk.

Additionally, we found that both the patient-level and hospital-level dual eligibility, as well as low AHRQ SES Index effects were significantly associated with COPD, CABG, AMI and pneumonia readmission.

The significance of the hospital-level effects indicates that if dual eligibility or low AHRQ SES Index variables were used to adjust for patient-level differences, then some of the differences between hospitals would also be adjusted for, potentially obscuring a signal of hospital quality

Finally, CMS adjusts for social risk (dual eligibility) within the Hospital Readmission Reduction Program (HRRP), which is consistent with recommendations from ASPE has also recommended that quality measures are not adjusted for SRFs (ASPE 2020). Given these empiric findings, ASPE's latest recommendations, and the fact that this is a hospital quality measure, CMS chose to not include these two social risk factors in the final risk model at this time.

Low Deviance R-squared

We appreciate this concern and agree that adequate risk adjustment for outcome measures is essential to ensure fairness. The deviance R squared evaluates how successful the fit is in explaining the variation of the data. Deviance R-squared can take on any value between 0 and 1, with a value closer to 1 indicating that a greater proportion of deviance is accounted for by the model. In quality measure development, models are not designed to optimize risk prediction but rather to account for differences in case mix that are unrelated to care quality. Some of the

variation of the data will necessarily occur due to differences in care quality – thus, a deviance R squared close to 1 is neither expected nor desired. A deviance R squared in the range of 10-15% is typical for admission-based quality measures. The NQF Scientific Methods Panel members agreed that it was in the expected range for an outcome measure.

Theme 3 – OPPORTUNITY FOR IMPROVEMENT

Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Committee Response

Thank you for your comments. The Standing Committee previously considered and discussed the performance gap and improvement in measure rates over time during the measure evaluation meetings. The Standing Committee acknowledged there remains a gap in performance due to variations of measures scores and ultimately recommended the measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on the measures.

Developer Response

We appreciate this concern and agree that adequate risk adjustment for outcome measures is essential to ensure fairness. The analyses submitting with our testing attachments (for each measure) show meaningful differences in performance and therefore substantial opportunity for improvement.

- [#0505] The range in performance is 11.5% to 22.9%, with a mean of 16.2%. The median odds ratio for the measure score is 1.15, meaning that a patient has a 15% increase in the odds of a readmission at higher risk performance hospital compared to a lower risk hospital.
- [#0506] The range in performance is 13.1% to 24.3%, with a mean of 16.7%. The difference between the 10th and 90th percentile is 2.6 percentage points.
- [#1891] The range in performance is 15.5% to 26.8%, with a mean of 19.6%. The difference between the 10th and 90th percentile is 2.3 percentage points.
- [#2515] The range in performance is 8.6% to 22.6%, with a mean of 12.8%. The difference between the 10th and 90th percentile is 3.2 percentage points.

The results demonstrate clinical meaningfulness, and they suggest meaningful variation in quality across hospitals.

Measure-Specific Comments

3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System (Yale CORE/CMS)

Commenters expressed concern that the attribution of this measure may not be reasonable, nor evidence based.

Committee Response

Thank you for your comments. The Standing Committee previously considered the attribution approach during the measure evaluation meetings and ultimately recommended the measure for endorsement. There were no objections from Standing Committee members to the developer response, nor any requests to reconsider or revote on this measure.

Developer Response

Acknowledging that there are multiple reasonable approaches for attributing patients to providers, CORE began by developing a set of criteria for selecting among attribution approaches. Building on key principles for attribution models set forth by the National Quality Forum, we sought to develop an attribution model that is fair to providers, aligned with the goals of the MIPS program, and transparent. Specifically, we judged attribution options based on the following principles and criteria, which were endorsed by our TEP:

1. Attribution models should be fair and accurate;
2. Attribution models should align with the stated goals and purpose of the measure;
3. Attribution models should be transparent.

The MIPS MCC measure attribution was developed with extensive input from the TEP and uses a visit-based approach to attribute patients to a primary care provider (PCP) or a specialist who typically coordinates or "quarterbacks" care for MCC patients included in the measure. Focusing on visits over charges when assigning responsibility acknowledges the importance of provider interaction with the patient in establishing accountability for outcomes. In most instances, the provider with the most visits is a PCP. The attribution approach prioritizes assignment to a PCP over a specialist given the PCP's central role in coordinating patient services, including specialty care. However, we recognize that there may be situations in which a specialist may be more likely to be managing the patient, even when a PCP is involved. Thus, the approach assigns patients to a "dominant" specialist if one is present. Multiple attribution approaches were tested, and the current approach was selected based on the above criteria and input from the TEP.

Member Expression of Support

Throughout the 16-week continuous public commenting period, NQF members had the opportunity to express their support ("support" or "do not support") for each measure submitted for endorsement review to inform the Committee's recommendations. One NQF member provided their expressions of support. Appendix C details the expression of support.

Appendix A: CSAC Checklist

The table below lists the key considerations to inform the CSAC's review of the measures submitted for endorsement review.

Key Consideration	Yes/No	Notes
Were there any process concerns raised during the CDP project? If so, briefly explain.	No	N/A
Did the Standing Committee receive requests for reconsideration? If so, briefly explain.	No	N/A
Did the Standing Committee overturn any of the Scientific Methods Panel's ratings of Scientific Acceptability? If so, state the measure and why the measure was overturned.	No	N/A
If a recommended measure is a related and/or competing measure, was a rationale provided for the Standing Committee's recommendation? If not, briefly explain.	N/A	N/A
Were any measurement gap areas addressed? If so, identify the areas.	No	N/A
Are there additional concerns that require CSAC discussion? If so, briefly explain.	No	N/A

Appendix B: Measures Not Recommended for Endorsement

The Committee did not determine that the measure should not be recommended for endorsement.

Appendix C: NQF Member Expression of Support Results

One NQF members provided their expressions of support/nonsupport. Six of seven measures under review received support from NQF members. Results for each measure are provided below.

0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization (CMS/Yale CORE)

Member Council	Support	Do Not Support	Total
Health Professional	0	1	1

0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization (CMS/Yale CORE)

Member Council	Support	Do Not Support	Total
Health Professional	0	1	1

0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization (CMS/Yale CORE)

Member Council	Support	Do Not Support	Total
Health Professional	1	0	1

2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery (CMS/Yale CORE)

Member Council	Support	Do Not Support	Total
Health Professional	1	0	1

2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions (CMS/Yale CORE)

Member Council	Support	Do Not Support	Total
Health Professional	1	0	1

3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System (CMS/Yale CORE)

Member Council	Support	Do Not Support	Total
Health Professional	0	1	1

Appendix D: Details of Measure Evaluation

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

Note: Vote totals may differ between measure criteria and between measures as Standing Committee members often have to join calls late or leave calls early. NQF ensures that quorum is maintained for all live voting. All voting outcomes are calculated using the number of Standing Committee members present for that vote as the denominator. Quorum (at least 16 out of 24 members in attendance) was achieved and maintained during the first web meeting on February 12. During the second web meeting on February 16, quorum was lost for NQF #2515—the last measure under review. Therefore, the Standing Committee discussed all relevant criteria for this measure and voting occurred after the meeting using an online voting tool.

Measures Recommended

#2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions

Submission **|**

Description: Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).

Numerator Statement: The outcome for this measure is the number of acute unplanned hospital admissions per 100 person-years at risk for admission during the measurement period.

Denominator Statement: Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs).

Attribution:

The outcome is attributed to the ACO to which the patient is assigned. (More details are provided in the next section.)

Person-time at risk

Persons are considered at risk for hospital admission if they are alive, enrolled in Medicare FFS, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time:

1) time spent in a SNF or acute rehabilitation facility;
2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and
3) time after entering hospice care.

Exclusions: The measure excludes the following patients:

1. Patients without continuous enrollment in Medicare Part A or B during the measurement period.
2. Patient enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year.
3. Patients without any visits with any of the Taxpayer Identification Numbers(TINs) associated with the attributed ACO during the measurement year or the year prior to the measurement year.
4. Patients not at risk for hospitalization during the measurement year.

Adjustment/Stratification: Statistical Risk Model/ Not applicable. This measure is not stratified.

Level of Analysis: Other

Setting of Care: Outpatient Services

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

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Importance to Measure and Report: The measure meets the Importance criteria.

(1a. Evidence, 1b. Performance Gap)
1a. Evidence: **Total Votes 20; Pass-20; No Pass-0**; 1b. Performance Gap: **Total Votes 20; H-1; M-17; L-2; I-0**
Rationale:

Evidence

- The Standing Committee reviewed the logic model that suggest that ACOs should be able to impact unplanned admissions through strengthening preventive care, delivering better coordinated and more effective chronic disease management, and providing timely ambulatory care for acute exacerbations of chronic disease.
- The Standing Committee considered several studies provided by the developer suggesting that improvements in the delivery of healthcare services for ambulatory patients with MCCs can lower the risk of admission, including a 2018 Annual ACO Survey, which indicates that the top priorities for ACOs included reducing avoidable emergency department (ED) visits and inpatient admissions, as well as reducing readmissions through better care transitions.
- The Standing Committee unanimously agreed that there is evidence to support the measure and passed the measure on this criterion.

Performance Gap

- The Standing Committee acknowledged that this is an updated measure (see S.3.2 of measure reliability section of Testing Attachment for updates) is currently not in use. The Standing Committee therefore considered testing data provided by the developer for the 2018 calendar year.
- Across ACOs, the developer reported risk-standardized measure scores ranging from 23.6 to 53.3 per 100 person-years, with a median of 38.6 and an interquartile range of 36.4 to 41.5.
- The Standing Committee reviewed the quartiles for the proportion of dual-eligible patients, which were Q1 (0.6-5.9%); Q2 (5.9-9.9%); Q3 (10.0-15.3%); Q4 (15.3-91.5%) with averages of 36.8, 39.5, 39.4 and 39.7, respectively.
- The Standing Committee did not have any major concerns or questions related to performance gap and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity
2a. Reliability: **Total Votes 19; Yes-19; No-0 (H-7; M-1; L-0; I-0 SMP)**; 2b. Validity: **Total Votes 20; Yes-20; No-0 (H-3; M-3; L-2; I-0 SMP)**

Rationale:

- The Standing Committee noted that this measure was reviewed by the Scientific Methods Panel, which passed the measure on both reliability and validity.

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the median signal-to-noise reliability score was 0.96 for all ACOs with at least one attributed MCC patient (N=559) with an interquartile range of 0.94 to 0.98, calculated using one year of data. A split-half analysis was not provided.
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-7; M-1; L-0; I-0).
- The Standing Committee did not have any questions or concerns and unanimously agreed to uphold the SMP's rating and passed the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that both face validity and empirical validity testing were conducted.

- For face validity, a 10-person Technical Expert Panel (TEP) was convened to provide input as to the conditions, groupings, and risk adjustment modeling. However, a quantitative analysis for face validity was not conducted.
- For empirical validity testing, the Standing Committee noted that the developer evaluated whether performance on the ACO measure was correlated with performance on five other ACO measures that assessed the same domains of quality (i.e., care coordination and management of chronic conditions): ACO1 -*CAHPS Getting Timely Care, Appointments, and Information*; ACO4 -*CAHPS Access to Specialists*; ACO8 -Risk Standardized, *All Condition Readmission*; ACO27 -*Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%); ACO28 -Controlling High Blood Pressure*.
- The Standing Committee considered the SMP's review, which raised some concern that four of the five comparator measures hypothesized a weak or poor relationship with the measure and there was a slightly negative but insignificant correlation with the control of high blood pressure measure (-0.07, p=0.673), which was not hypothesized.
- The Standing Committee noted that despite these concerns, the SMP voted to pass the measure on validity with a moderate rating (H-3; M-3; L-2; I-0).
- The Standing Committee noted that it was not expected that blood pressure would have a big effect on the admission to the hospital, so the lack of a strong correlation wasn't suspect.
- The Standing Committee did not raise any further questions or concerns and ultimately upheld the SMP's decision to pass the measure.

Feasibility: Total Votes 21; H-10; M-11; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 21; Pass-21; No Pass-0** *4b. Usability:* **Total Votes 21; H-3; M-17; L-1; I-0**

Rationale:

- The Standing Committee recognized that this is an updated measure (see S.3.2 of measure reliability section of Testing Attachment for updates) that is not yet in use and that CMS has proposed to include this updated measure in the Alternative Payment Models (APM) Performance Pathway quality measure set to be reported on by Medicare ACOs.
- Further, the Standing Committee acknowledged that this updated measure would replace the original measure in the Medicare Shared Savings Program (MSSP) beginning with Performance Year 2021 if finalized by CMS.
- The Standing Committee emphasized the need for the dissemination of the measure reports to accountable entities to ensure there is continuous feedback and that this measure was effective.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee acknowledged that this is an updated measure that is not currently in use, and therefore, the developer has not identified any potential harms related to the use of this updated measure.
- The Standing Committee questioned whether this measure is usable for quality improvement and whether the Standing Committee is voting on how it is used. The NQF staff provided clarity that the Use criterion looks at whether a measure is being used in an accountability application or for public reporting. Beyond that, the NQF criteria are agnostic to use.
- There was some discussion on how this measure attributes patients to ACOs. The developer mentioned that the ACO program has an attribution algorithm that the measure will adopt. Therefore, this is not part of the measure specification, but the attribution decisions are at the program-level.
- There were no further questions raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to NQF 3597: *Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions Under the Merit-Based Incentive Payment System*.
- The developer states that the measure specifications are harmonized to the extent possible.
- The developer states that the measure differs in the attribution (due to the intent of the CMS program), and that the cohorts, outcomes, and the risk-adjustment models differ accounting for differences in their target populations and measurement settings.

Standing Committee Recommendation for Endorsement: **Total Votes 21; Y-21**; **N-0**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions Under the Merit-Based Incentive Payment System

Submission |

Description: Risk-Standardized rate of acute, unplanned hospital admissions among Medicare Fee-for-Service (FFS) patients aged 65 years and older with multiple chronic conditions (MCCs).

Numerator Statement: The outcome for this measure is the number of acute admissions per 100 person-years at risk for admission during the measurement period.

Denominator Statement: Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs).

Provider types included for measurement

- Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine; and non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.
- Relevant specialists: Specialists covered by the measure are limited to those who provide overall coordination of care for patients with MCCs and who manage the chronic diseases that put the MCCs patients in the measure at risk of admission. These specialists were chosen with input from our TEP and include cardiologists, pulmonologists, nephrologists, neurologists, endocrinologists, and hematologists/oncologists. However, as indicated below and in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure.

Patient attribution

We begin by assigning each patient to the clinician most responsible for the patient's care. The patient can be assigned to a PCP, a relevant specialist, or can be left unassigned.

- A patient who is eligible for attribution can be assigned to a relevant specialist only if the specialist has been identified as "dominant." A specialist is considered "dominant" if they have two or more visits with the patient, as well as at least two more visits than any PCP or other relevant specialist. For example, if a patient saw a cardiologist four times in the measurement year, a PCP twice, and a nephrologist twice, the patient would be assigned to the cardiologist, having met the definition of "dominant" specialist. Note: Hematologists and oncologists are considered relevant specialists as they could be expected to manage MCCs patients' care, especially during periods of acute cancer

treatment. However, as indicated below in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure.

- There are two scenarios where a patient can be assigned to a PCP. First, the patient must have seen at least one PCP. The patient will then be assigned to the PCP with the highest number of visits as long as there is no relevant specialist who is considered "dominant." Second, if the patient has had more than one visit with a relevant specialist but no "dominant" specialist has been identified, and has two or more visits with a PCP, they will be assigned to that PCP.
- Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no "dominant" specialist can be identified, or if the patient has not had more than one visit with any individual PCP.

Patients are then assigned at the TIN level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN.

- At the TIN level, patients are first assigned to the clinician (unique National Provider Identifier (NPI)/TIN combination since a given provider can be affiliated with more than one TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above) and then patients "follow" their clinician to the TIN designated by the clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level.

(Note that an alternative attribution approach was considered and assessed as described in section 2b.3.11 of the testing attachment and in Appendix C of the attached methodology report.)

Person-time at risk

Persons are considered at risk for hospital admission if they are alive, enrolled in Medicare FFS, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time:

1) time spent in a SNF or acute rehabilitation facility;
2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and
3) time after entering hospice care.

Exclusions: We exclude patients from the cohort for these reasons:

1. Patients without continuous enrollment in Medicare Part A or B during the measurement period.
2. Patients enrolled in hospice at any time during the year prior to the measurement year or at start of the measurement year.
3. Patients with no E&M visit to a MIPS eligible clinician.
4. Patients assigned to clinicians who do not participate in the Quality Payment Program (QPP) on the MIPS track.
5. Patients attributed to hematologists and oncologists.
6. Patients not at risk for hospitalization during the measurement year.

Adjustment/Stratification: Statistical Risk Model/ N/A. This measure is not stratified.

Level of Analysis: Clinician : Group/Practice

Setting of Care: Outpatient Services

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/12/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 19; Pass-19; No Pass-0**; 1b. Performance Gap: **Total Votes 20; H-6**; **M-13**; **L-1**; **I-0**

Rationale:

Evidence

- The Standing Committee considered a logic model depicting that outpatient providers can decrease the rate of hospital admissions for patients with MCCs by providing improved care coordination and continuity of care.
- The Standing Committee also considered several studies that support the assertion that ambulatory care clinicians can influence admission rates through quality of care. Some examples listed in literature included supplementing patient telephone calls with in-person meetings; occasionally meeting in person with providers; acting as a communication hub for providers; providing patients with evidence-based education; providing strong medication management; and providing comprehensive and timely transitional care after hospitalizations.
- The Standing Committee discussed the attribution of the measure, seeking clarity as to whether it was different than the previous ACO-level measure (NQF #2888). The developer commented that for the ACO measure, attribution was conducted at the program level; whereas, with NQF #3597, the attribution is part of the measure itself. It was built and tailored, specifically for the measure, by engaging an expert panel and frontline clinicians.
- The Standing Committee unanimously agreed that there is evidence to support the measure and passed the measure on this criterion.

Performance Gap

- The Standing Committee reviewed the performance gap results.
- Across all provider TINs, in 2018, with at least one attributed MCC patient, the risk-standardized acute admission rate (RSAAR) measure scores ranged from 17.5 to 131.5 per 100 person-years, with a median of 38.7 and an interquartile range of 36.5 to 41.8. The mean RSAAR and standard deviation were 39.5 ± 5.8 admissions per 100 person-years.
- Regarding the disparities, the Standing Committee considered the rate ratios and 95% confidence intervals of 1.08 (1.07, 1.08) for the AHRQ SES variable and 1.04 (1.04, 1.05) for the specialist density variable.
- The Standing Committee did not have any major concerns or questions related to performance gap and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 18; Yes-15; No-3 (H-5; M-2; L-0; I-1 SMP)**; 2b. Validity: **Total Votes 18; Yes-17; No-1 (H-0; M-7; L-1; I-0 SMP)**

Rationale:

- The Standing Committee noted that this measure was reviewed by the Scientific Methods Panel, which passed the measure on both reliability and validity.

Reliability

- The Standing Committee considered the reliability testing for this measure, noting a mean and median signal-to-noise reliability for the MIPS MCC measure of 0.453 and 0.451, respectively (range 0.038-0.999, interquartile range (IQR) 0.190-0.694). These results were for all MIPS TINs with at least one attributed MCC patient.
- After applying a case minimum of 18 MCC patients per clinician group and the group size threshold of >15 clinicians per group, mean and median reliability for 4,044 TINs was 0.809 and 0.873, respectively (range 0.413-0.999, IQR 0.683-0.961)
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-5; M-2; L-0; I-1).
- The Standing Committee discussed the minimum threshold of 15 clinicians in a group and questioned how generalizable this measure will be, as one Standing Committee member from the American Academy of Family Physicians noted that their average clinician group size is six with a median of three.
- The developer commented that it is the volume of patients per TIN that drives reliability and that CMS makes these decisions about the cut points during rulemaking. Further, the MIPS program will not go below a reliability of 0.4, and there is a balance that CMS is trying to achieve between increasing the number of patients and clinicians captured in the measure versus maintaining a strong reliability score.

- The Standing Committee recognized that a similar concern regarding the minimum clinician threshold that had been discussed by the Standing Committee in the past, specifically NQF #3495. That measure was bifurcated at a group level and at an individual clinician level. The Standing Committee did not approve it at the individual level because the reliability results were too low, but approved it at the group-level because, in that case, the clinician groups had enough patients to show sufficient reliability.
- The Standing Committee did not have any further questions or concerns and ultimately agreed to uphold the SMP's rating and passed the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that only face validity was conducted.
- For face validity, the developer convened a TEP to provide input as to the conditions, groupings, and risk adjustment modeling. Public commenting was also requested. A survey of the TEP showed 83 % of respondents agreed that the MIPS MCC admission measure can be used to distinguish good from poor quality of care. Of 11 member assessing ability to distinguish good from poor, five of 11 somewhat agreed, five moderately agreed, and one strongly disagreed.
- The Standing Committee reviewed the risk adjustment model, which included 49 variables (47 demographic and clinical variables and two social risk factors). The Standing Committee recognized that the model was built off work done for the ACO MCC admission measure. Social risk factors included in the model were low AHRQ SES index and low physician-specialist density.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-7; L-1; I-0). Further, since the developer only conducted face validity, the Standing Committee acknowledged that the highest rating for validity is a "moderate" rating.
- The Standing Committee did not raise any questions or concerns and voted to uphold the SMP's decision to pass the measure.

Feasibility: Total Votes 18; H-8; M-9; L-1; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-17; No Pass-1** *4b. Usability:* **Total Votes 18; H-0; M-14; L-4; I-0**

Rationale:

- The Standing Committee recognized that this measure is not currently publicly reported or used in an accountability application. CMS proposes this measure for use under the MIPS.
- The Standing Committee recognized that MAP conditionally supported the measures pending NQF endorsement for MSSP but provided a "do not support" for the MIPS program, with potential for mitigation. Those areas of mitigation included that
    1) the measure should apply to clinician groups, not to individual clinicians. This recommendation was partly driven by reliability results and partly by concerns that individual clinicians may lack the necessary resources and structural supports to effectively reduce the risk of admissions among their MCC patients compared with larger groups of clinicians.
    2) The measure should use a higher reliability threshold, (e.g., 0.7).
    3) The measure developer should consider the NQF guidance on attribution and consider patient preference and selection as a method of attribution as that date becomes available.
    4) The measure should undergo the NQF endorsement process.
- The Standing Committee did not raise any major concerns and passed the measure on Use.

- For Usability, the Standing Committee acknowledged that since this is a new measure and not currently in use, there is no year over year performance data. Furthermore, the developer has not provided any information on potential harms.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to NQF #2888 *Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions*.
- The developer states that the measure specifications are harmonized to the extent possible. The only differences are for the CMS programs and measurement levels for which they are intended: For example, the MIPS measure is attributed and scored for clinician groups under MIPS, and the ACO MCC admission measure is attributed and scored for Medicare ACOs.

1. **Standing Committee Recommendation for Endorsement**: **Total Votes 19; Y-17**; **N-2**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters expressed concern that the attribution of this measure may not be reasonable, nor evidence based.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization

Submission |

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65 and older. 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.

Additional details are provided in S.5 Numerator Details.

Denominator Statement: The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details

Exclusions: The 30-day HF readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
2. Discharged against medical advice (AMA);
3. Admitted within 30 days of a prior index admission for HF; and
4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 17; Pass-17; No Pass-0**; 1b. Performance Gap: **Total Votes 16; H-1**; **M-12**; **L-3**; **I-0**

Rationale:

Evidence

- The Standing Committee considered a logic model connecting care processes and elements of patient care with patient outcomes.
- The Standing Committee also reviewed the updated evidence since the measure's last endorsement review, which included a report that found transitional care models that prioritize effective collaboration and communication within and across providers/facilities demonstrate significant hospital readmissions reductions after AMIs.
- The Standing Committee unanimously agreed that there is evidence to support the measure and passed the measure on this criterion.

Performance Gap

- The Standing Committee reviewed the performance gap results.
- During the measurement period of July 2016-June 2019, heart failure readmission rates ranged from a minimum of 16.7% to a maximum of 31.2%, with the 10th percentile at 20.3%, the 50th percentile at 21.9%, and the 90th percentile at 23.7%
- Regarding disparities, performance scores were provided (using July 2016 -June 2019 data) for hospitals by proportion of dual eligible patients and performance scores for hospitals according to proportion of patients with AHRQ SES Index Score in the lower and upper social risk quartiles.
- The Standing Committee discussed whether the 3.4% range from the 10^{th} and 90^{th} percentiles was a sufficient gap. The developer commented that this measure is capturing 4,000 hospitals, and in looking beyond the 10^{th} and 90^{th} percentiles, there are still a significant number of hospitals in these extremes.
- One Standing Committee member questioned whether hospitals are stable within that range or if they can they move around if they change what they are doing. Another Standing Committee member commented that hospitals are spending a lot of money to mitigate risk of readmission and may not be seeing much improvement.
- The developer commented that there has been evidence to show that for hospitals that focus on improving readmissions can lower their rates up to 20%, and that safety net hospitals were able to improve faster than other hospitals.

- One Standing Committee commented that hospitals should stratify this type of measure by race, ethnicity, language spoken, etc. to identify improvement opportunities.
- The Standing Committee did not have any other questions related to performance gap and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 17; Yes-15; No-2 (H-0; M-7; L-1; I-0 SMP)**; 2b. Validity: **Total Votes 17; Yes-14; No-3 (H-2; M-5; L-1; I-0 SMP)**

Rationale:

- The Standing Committee noted that this measure was reviewed by the Scientific Methods Panel, which passed the measure on both reliability and validity.

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted an intraclass correlation coefficient for hospitals with 25 or more admissions and found a 0.587 agreement between the two independent assessments of the RSRR for each hospital. A signal-to-noise method was also employed, and the median reliability score was 0.57, ranging from 0.14 to 0.96. The 25th and 75th percentiles were 0.31 and 0.75, respectively.
- The Standing Committee acknowledged the public comments received prior to the measure evaluation meeting from the American Medical Association, raising concern the measure does not meet a minimum reliability score of 0.7.
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-0; M-7; L-1; I-0).
- The Standing Committee discussed what the appropriate minimum threshold should be for reliability. NQF staff commented that other NQF-convened groups, including the SMP, have discussed this at length. There really is not a universal threshold of reliability and that the Standing Committee should decide if they are willing to accept the data presented. NQF staff further mentioned that measures with reliability scores that are less than 0.7 have been endorsed by this Standing Committee in the past.
- One Standing Committee member agreed that there is a lack of consensus with reliability thresholds. The Standing Committee member encouraged CMS to reconsider the case volume cut points for the measure in order to help address these reliability concerns, as sample size can drive reliability.
- CMS responded that increasing the case volume would result in a drop in the number of hospitals that would be included in the measure. It is a tradeoff, and that for meaningful measure that assess important serious outcomes such as mortality or surgical procedure, it might be reasonable to accept a slightly lower reliability in order to capture more low-volume providers.
- The Standing Committee did not have any further questions and ultimately agreed to uphold the SMP's rating and passed the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted empirical validity testing at the score level using three external hospital quality measures: Hospital Star Rating readmission group score; Overall Hospital Star Rating; and HF Excess Days in Acute Care (EDAC).
- The Standing Committee acknowledged that the results aligned with the developer's predictions. Correlation between HF RSRRs and Star-Rating readmissions score: - 0.585. The

correlation between HF RSRRs and Star-Rating summary score: -0.378. The correlation between HF RSRRs and HF EDAC scores: 0.574

- The Standing Committee reviewed the risk adjustment model, which included 37 risk factors; social risk factors (SRF, dual eligibility, and ASPE SES index) were tested but not included in the final specification.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-2; M-5; L-1; I-0).
- Regarding risk adjustment, CMS commented that CMS does not adjust for dual eligibility at the measure level for the Hospital Readmission Reduction Program, adding that the program stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. It groups the hospitals into five equal groups. And those quintiles are sorted based on percentage of dual eligibility patients. CMS further added that it would take Congressional action to be able to override that.
- Additionally, CMS does provide detailed information around stratification of the measures so that hospitals can see how well they are doing for dual-eligibles compared to all other hospitals caring for dual-eligibles, and the gap between dual-eligibles and non-dual-eligibles.
- The Standing Committee did not raise any questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 18; H-7; M-10; L-1; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 17; Pass-17; No Pass-0** *4b. Usability:* **Total Votes 16; H-0; M-14; L-2; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently in use in Hospital Compare and Hospital Readmissions Reduction Program.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median HF 30-day, all-cause, RSRR for the HF readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 21.9 %. The median RSRR increased by 0.1 absolute percentage points from July 2016-June 2017 (median RSRR: 21.8%) to July 2018-June 2019 (median: RSRR: 21.9%).
- The Standing Committee discussed whether this measure has plateaued due the limited change in measures rates over time. The developer commented there is still a substantial number of hospitals that appear to have room to improve, and there continues to be evidence to support the ability to improve.
- The Standing Committee also mentioned that the ability for a hospital to impact this measure was not under the control of the hospital, but rather, it was the services provided in the community (e.g., visiting nurses, pharmacies). Another point to consider is that certain communities may not have those needed services due to resource constraints.
- The developer commented that CMS is increasingly incentivizing improvements in readmission rates in other settings and across sectors to promote care coordination with those community services. Additionally, the developer stated that there have been a number of studies suggesting that safety net hospitals have actually been improving on this measure, quicker than other hospitals.

- The Standing Committee questioned whether there has been an increase in mortality as readmission rates for heart failure decreased. CMS responded stating that this is taken very seriously. CMS cited a MedPAC study from 2018 and also commissioned an independent study to assess this, and there has been no systematic evidence in terms of increased mortality.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
- NQF #0229 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization
- NQF #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization
- NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- NQF #1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
- NQF #2879 Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data
- NQF #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)
- NQF #2886 Risk-Standardized Acute Admission Rates for Patients With Heart Failure
- NQF #2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions
- The developer indicated that all measure specifications have been harmonized to the furthest extent possible.
- The developer did not include non-outcome (e.g., process) measures with the same target population as NQF #0330 in its list of related measures. The developer noted the patient exclusion limitations of non-outcome measures and explained that clinical coherence of the cohort takes precedence over alignment with related non-outcome measure.

Standing Committee Recommendation for Endorsement: **Total Votes 16; Y-16**; **N-0**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization

Submission **|**

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Additional details are provided in S.5 Numerator Details.

Denominator Statement: The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.7 Denominator Details.

Exclusions: The 30-day AMI readmission measure excludes index admissions for patients:

1) Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
2) Discharged AMA;
3) Same-day discharges; or
4) Admitted within 30 days of a prior index admission for AMI.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 17; Pass-17; No Pass-0**; 1b. Performance Gap: **Total Votes 18; H-3**; **M-14**; **L-1**; **I-0**

Rationale:

Evidence:

- The Standing Committee considered the evidence in which the developer reviewed 264 articles related to readmissions following an AMI admission, noting that there were interventions that can be implemented to improve readmission rates.
- The Standing Committee did not raise any questions or concerns and passed the measure on Evidence.

Performance Gap

- The Standing Committee reviewed the performance gap results.
- During the measurement period of July 2016 through June 2019, the developer tested the measure across 4,074 hospitals and 482,163 admissions. Acute Myocardial Infarction readmission rates ranged from a minimum of 11.5% to a maximum of 22.9%, with the 10th percentile at 15.3%, the 50th percentile at 16.1%, and the 90th percentile at 17.1%.
- Regarding disparities, the Standing Committee considered data (sources include Medicare FFS claims, VA claims and Medicare Beneficiary Summary File (MBSF) data) that suggested there are performance disparities based on dual-eligible status, which the developer supported with literature demonstrating differential healthcare and health outcomes among dual-eligible patients.

- The Standing Committee did not raise any questions or concerns and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 17; H-0; M-11; L-4; I-2**; 2b. Validity: **Total Votes 17; Yes-16; No-1 (H-0; M-5; L-4; I-0 SMP)**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted split sample (i.e., test-retest) method to measure the extent of agreement between two independent assessments of the RSRR. Using a combined 2016-2019 sample of 482,163 admissions, the developer calculated an intraclass correlation coefficient (ICC) of 0.424 for hospitals with 25 admissions or more. Additionally, a signal-to-noise method was employed for each hospital with at least 25 admissions. The median reliability score was 0.51, ranging from 0.14 to 0.91. The 25th and 75th percentiles were 0.33 and 0.66, respectively.
- The Standing Committee considered the SMP review of this measure and noted that the SMP did not reach consensus for reliability (H-0; M-5; L-4 I-0).
- The Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to pass the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted validity testing at the performance measure score level by assessing AMI readmission scores correlation with other measures that target the same domain of quality for the same or similar populations. Hospital Star Rating readmission group score; Overall Hospital Star Rating; and AMI EDAC
- The results aligned with the developer's predictions: Correlation between AMI RSRRs and Star-Rating readmissions score: - 0.413; The correlation between AMI RSRRs and Star-Rating summary score: -0.266; The correlation between AMI RSRRs and AMI EDAC scores: 0.425.
- The Standing Committee reviewed the risk adjustment model, which included 31 risk factors; social risk factors (SRF, dual eligibility, and AHRQ SES index) were tested but not included in the final specification. The Standing Committee acknowledged that the developer reported that adjusting for social risk factors had little impact on hospital-level measure scores.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-8; L-1; I-0).
- The Standing Committee did not raise any questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 17; H-7; M-10; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 18; H-0; M-15; L-3; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently in use in Hospital Compare and Hospital Readmissions Reduction Program.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the AMI readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 16.1%. The median RSRR decreased by 0.6 absolute percentage points from July 2016-June 2017 (median RSRR: 16.3%) to July 2018-June 2019 (median: RSRR: 15.7%).
- The Standing Committee considered that research has also explored potential spillover effects of the AMI readmission measures' implementation and reductions in readmissions for non-targeted conditions. The developer states that several studies support positive spillover effects, as there has been systematic improvement in risk-standardized readmission rates for patients not included in HRRP measures.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
- NQF #0230 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI) Hospitalization
- NQF #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
- NQF #0730 Acute Myocardial Infarction (AMI) Mortality Rate
- NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- NQF #2431 Hospital-Level, Risk-Standardized Payment Associated With a 30-Day Episode-of-Care for Acute Myocardial Infarction (AMI)
- NQF #2473 Hybrid Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI)
- NQF #2879 Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data
- NQF #2881 Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)

Non-NQF endorsed – NQF #0698: 30-Day Post-Hospital AMI Discharge Care Transition Composite Measure (Measure Steward: Centers for Medicare and Medicaid Services)

- The developer indicated that all measure specifications have been harmonized to the furthest extent possible.
- The developer did not include non-outcome (e.g., process) measures with the same target population as NQF 0330 in its list of related measures. The developer noted the patient exclusion limitations of non-outcome measures and explained that clinical coherence of the cohort takes precedence over alignment with related non-outcome measure.

Standing Committee Recommendation for Endorsement: **Total Votes 16; Y-14**; **N-2**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As

a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

Submission **|**

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Denominator Statement: The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

Exclusions: The 30-day pneumonia (PN) readmission measure excludes index admissions for patients:

1. AMA;
2. Without at least 30 days post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
3. Admitted within 30 days of a prior index admission for pneumonia.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence **Total Votes 16; Pass-16; No Pass-0**; 1b. Performance Gap: **Total Votes 16; H-0**; **M-14**; **L-2**; **I-0**

Rationale:

Evidence:

- The Standing Committee considered the updated evidence in which the developer cited evidence that showed Transitions Across Care Settings (TRACS) as one example of how transitional care models focusing on coordination decrease the risk of readmission within 30 days of hospital discharge. Researchers were able to reduce pneumonia readmissions by 4.4%. The overall readmission rate for 104 patients in the pilot TRACS program was 4.8% with 4.4% of for pneumonia.
- The Standing Committee did not raise any questions or concerns and passed the measure on Evidence.

Performance Gap

- The Standing Committee reviewed the performance gap results. The developer provided data showing variation in readmission rates in data from July 1, 2016 to June 30, 2019 Medicare claims and Veteran Affairs (VA) administrative data (n= 1,374,891 admissions from 4,697 hospitals). The three-year hospital-level risk standardized readmission rates (RSRRs) had a mean of 16.7% and a min-max range of 13.1-24.3% in the study cohort.
- The developer provided data from Medicare FFS claims, VA data, and MBSF from July 2016 through June 2019 showing the variation in RSRRs across hospitals (with at least 25 cases) by proportion of patients with social risk.
- The Standing Committee did not raise any questions or concerns and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 17; Yes-17; No-0 (H-1; M-7; L-1; I-0 SMP);** 2b. Validity: **Total Votes 17; Yes-17; No-0 (H-0; M-8; L-1; I-0 SMP)**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted score-level testing using signal-to-noise reliability testing and intra-class correlation coefficient (ICC). The developer reported signal-to-noise reliability scores ranging from 0.13 to 0.96, with a mean of 0.53, median of 0.56 and an interquartile range of 0.34 and 0.73, respectively.
- The ICC of 0.544 was calculated using a split sample (i.e., test-retest) method.
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-1; M-7; L-1; I-0).
- The Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to uphold the SMP rating on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer utilized a validation approach that compared the 30-day pneumonia readmission measure results against the Hospital Star Rating readmission domain and summary scores as well as the pneumonia EDAC after hospitalization for pneumonia measure.
- The correlation between pneumonia RSRRs and Star-Rating readmissions score is -0.564, which led the developer to suggest that hospitals with lower Pneumonia RSRRs are more likely to have higher Star-Rating readmission scores.
- Pneumonia RSRRs and Star-Rating summary score is -0.371, which led the developer to suggest that hospitals with lower pneumonia RSRRs are more likely to have higher Star-Rating summary scores.
- Pneumonia RSRRs and pneumonia EDAC scores is 0.625, which led the developer to suggest that hospitals with lower pneumonia RSRRs are more likely to have lower Pneumonia EDAC scores.
- The Standing Committee reviewed the risk adjustment model, which included 41 risk factors, assessing model performance with discrimination and calibration statistics.
- The Standing Committee acknowledged that developer did not adjust for the low AHRQ SES or the dual eligible variables due to the little impact on measure scores. The developer also conducted a decomposition analysis and reports that each of the variables showed a considerably greater hospital-level effect, compared with the patient-level effect and that any patient-level adjustment alone may also adjust for quality differences between hospitals.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-8; L-1; I-0).
- The Standing Committee discussed the impact of COVID-19-related pneumonia for this measure and whether that was adjusted for within the model. The developer commented that testing data for this measure was pre-COVID-19 and not currently in the risk adjustment model. However, CMS is actively working on looking at the impact of COVID-19 going forward.
- The Standing Committee did not raise any other questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 17; H-4; M-13; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 19; H-0; M-15; L-3; I-1**

Rationale:

- The Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the pneumonia readmission measure for the three-year period between July 1, 2016 and June 30, 2019 of 16.6% that increased by 0.2 absolute percentage points from July 2016-June 2017 (median RSRR: 16.5%) to July 2018-June 2019 (median: RSRR: 16.7%).
- The Standing Committee acknowledged that there have been no unintended consequences or harms related to the use of this measure, and that CMS commissioned an independent panel of statisticians to review all the literature around unintended harm and found no issues. This was also supported the MedPAC reports that came out.

- The Standing Committee underscored that COVID-19 will have a significant impact on this measure, which will require decisions on whether to risk adjust for or possibly exclude these patients from the measure.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
- NQF #0231 Pneumonia Mortality Rate (IQI #20)
- NQF #0279 Community Acquired Pneumonia Admission Rate (PQI 11)
- NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- NQF #2579 Hospital-level, Risk-Standardized Payment Associated With a 30-Day Episode of Care for Pneumonia (PN)
- NQF #2882 Excess Days in Acute Care (a) After Hospitalization for Pneumonia
- The developer states that these measures are not completely harmonized.
- The developer did not list any non-outcome (e.g., process) measures with the same target population as their measure. Since this is an outcome measure, the developer asserted that clinical coherence of the cohort takes precedence over alignment with related non-outcome measures, which are also limited due to broader patient exclusions.

Standing Committee Recommendation for Endorsement: **Total Votes 17; Y-16**; **N-1**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization

Submission |

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) 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 and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this 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 the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days

after discharge from the index admission, only the first 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.

Denominator Statement: The cohort includes admissions for patients aged 65 or older who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.9 Denominator Details.

Exclusions: The 30-day COPD readmission measures exclude index admissions for patients:

1. Without at least 30 days post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
2. Discharged AMA; and,
3. Admitted within 30 days of a prior index admission for COPD.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

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

Rationale:

Evidence:

- The Standing Committee considered the logic model depicting that the risk of readmission can be decreased by delivering timely, high-quality care; reducing the risk of infection and other complications; ensuring the patient is ready for discharge; improving communication among providers involved at care transition, reconciling medications; educating patients about symptoms, whom to contact with questions, and where/when to seek follow-up care; and encouraging strategies that promote disease management
- The Standing Committee further considered evidence of integrated care management after hospitals discharge, which has suggested clinical benefit.
- The Standing Committee did not raise any questions or concerns and passed the measure on Evidence.

Performance Gap

- The Standing Committee reviewed the performance gap results. The developer provided Medicare claims and Veteran Affairs (VA) administrative data (n= 825,497 admissions from 4,643 hospitals) data showing variation from July 1, 2016 to June 30, 2019 in hospital-level RSRRs. There was a mean of 19.6 % and range from 15.5-26.8% in the study cohort. As shown below, the median risk-standardized rate is 19.6%.
- The developer provided Medicare FFS claims, VA data, and MBSF data from July 2016 through June 2019 showing variation in RSRRs across hospitals (with at least 25 cases) by proportion of patients with social risk.

- The Standing Committee did not raise any questions or concerns and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 17; Yes-17; No-0 (H-1; M-4; L-3; I-0 SMP);** 2b. Validity: **Total Votes 17; Yes-17; No-0 (H-0; M-6; L-2; I-0 SMP)**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted score-level testing using split-sample reliability testing, calculating an intraclass correlation coefficient of 0.406. The developer also conducted signal-to-noise reliability testing, reporting signal-to-noise reliability scores ranging from 0.11 to 0.90, a median of 0.43 demonstrating moderate agreement. The interquartile range is 0.34 and 0.73.
- The SMP reviewed this measure for reliability and passed the measure with a moderate rating (H-1; M-4; L-3; I-0).
- The Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to uphold the SMP rating on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted empirical validity testing at the measure score level. Correlations were reported for COPD RSRRs and Star Rating Readmissions score, which was -0.442. This led the developer to suggest that hospitals with lower COPD RSRRs are more likely to have higher Star Rating Readmission scores. COPD RSRRs and Star Rating summary score was -0.286, which led the developer to suggest that hospitals with lower COPD RSRRs are more likely to have higher Star Rating summary scores.
- The Standing Committee reviewed the risk adjustment model, which included 40 risk factors, assessing model performance with discrimination and calibration statistics.
- The Standing Committee acknowledged that the developer did not adjust for the low AHRQ SES or the dual eligible variables due to the little impact on measure scores. The developer also conducted a decomposition analysis and reports that each of the variables showed a considerably greater hospital-level effect, compared with the patient-level effect and that any patient-level adjustment alone may also adjust for quality differences between hospitals.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-6; L-2; I-0).
- Similar to NQF #0506 discussions, the Standing Committee discussed that COVID-19 will have a significant impact on this measure, which will require decisions on whether to risk adjust for or possibly exclude these patients from the measure.
- The Standing Committee did not raise any other questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 18; H-5; M-11; L-2; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 18; H-0; M-16; L-2; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the COPD readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 19.6 %. The median RSRR increased by 0.1 absolute percentage points from July 2016-June 2017 (median RSRR: 19.5%) to July 2018-June 2019 (median: RSRR: 19.6%)
- The Standing Committee acknowledged that the developer expected an increase in the observed COPD readmission rate between 2017-2018 due to a worse than normal flu season, though flu severity was moderate from 2018-2019 (CDC).
- The Standing Committee considered that there have been no unintended consequences or harms related to the use of this measure.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
- NQF #0275 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)
- NQF #0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
- NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- NQF #1893 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
- NQF #2879 Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data
- NQF #2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions
- The developer states that the measure is harmonized to the fullest extent with these measures.
- The developer did not list any non-outcome (e.g., process) measures with the same target population as their measure. Since this is an outcome measure, the developer asserted that clinical coherence of the cohort takes precedence over alignment with related non-outcome measures, which are also limited due to broader patient exclusions.

Standing Committee Recommendation for Endorsement: Total Votes 18; Y-17; **N-1**

Rationale

-

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery

Submission **|**

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older.

An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.

Numerator Statement: The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Denominator Statement: The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.

Exclusions: For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions:

1. Without at least 30 days post-discharge enrollment in Medicare FFS
2. Discharged AMA
3. Admissions for subsequent qualifying CABG procedures during the measurement period

Adjustment/Stratification: Statistical risk model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 16; Pass-16; No Pass-0**; 1b. Performance Gap: **Total Votes 16; H-5**; **M-11**; **L-0**; **I-0**

Rationale:

Evidence:

- The Standing Committee agreed that this is an important focus area of measurement and acknowledged the inclusion of a logic model depicting a connection between quality of care and interventions such as improved discharge planning, reconciling patient medications, and improved communication with outpatient providers to reduced admission rates.

- A Standing Committee member inquired if the patients in 2014 are different from patients in 2021, specifically if there is anything in the evidence that articulates how the patient population per capita has changed since the introduction of the measure in 2014.
- The developer commented that it cannot state exactly how the cohort has changed since 2014, but the measure can withstand cohort shifts. The developer added that the risk adjustment models are updated every year to make sure that if a given risk factor becomes either stronger or weaker in terms of its relevance to readmission, then the measure will adapt accordingly if the cohort is changing.
- The Standing Committee unanimously passed the measure on the evidence criterion.

Performance Gap

- The Standing Committee reviewed the performance gap results. The developer provided data showing variation in readmission rates in data from July 1, 2016 to June 30, 2019 Medicare claims data (n=131,592 admissions from 1,160 hospitals) and VA administrative data. The three-year hospital-level risk standardized readmission rates (RSRRs) have a mean of 12.8% and a range of 8.6% - 22.6% in the study cohort. The median RSRR is 12.7%.
- The developer provided data from Medicare FFS claims and MBSF from July 2016 through June 2019 showing the variation in RSRRs across hospitals (with at least 25 cases) by proportion of patients with social risk.
- The Standing Committee observed that the room for improvement with this measure was slightly wider than previously reviewed measures and passed the measure on performance gap with a rating of moderate.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 18; H-1; M-16; L-1; I-0;** 2b. Validity: **Total Votes 18; H-1; M-17; L-0; I-0**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure. The developer reported signal-to-noise reliability scores ranging from 0.27 to 0.92, with a mean and median of 0.60, mean of 0.58, and an interquartile range of 0.45 and 0.71, respectively.
- The developer also calculated an intra-class correlation coefficient (ICC) of 0.436 using a split sample (i.e., test-retest) method.
- The SMP reviewed this measure for reliability and passed the measure with a moderate rating (H-1; M-7; L-1; I-0).
- The Standing Committee agreed that the concerns of low case volume thresholds and the impact on reliability scores were very similar to those previously discussed for measure NQF #0330 and voted to uphold the SMP rating on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted empirical validity testing at the measure score level. The developer examined the relationship between the performance of risk-standardized readmission rate COPD readmission measure scores to that of Hospital Star Rating Readmission group scores, Hospital CABG Surgical Volume, and the Overall Hospital Star Ratings.
- The correlation between CABG RSRRs and: Star-Rating readmissions score is -0.307; Star-Rating summary score is -0.238; and Hospital CABG admission volume among hospitals with more than

25 CABG admissions show mean RSRRs slightly lower among high volume hospitals compared to lower volume hospitals.
- The developer also conducted face validity testing and found 71% of TEP members agreed (somewhat, moderately, or strongly) that the measure will provide an accurate reflection of quality.
- The Standing Committee reviewed the risk adjustment model, which included 26 risk factors, assessing model performance with discrimination and calibration statistics.
- The Standing Committee acknowledged that developer did not adjust for the low AHRQ SES or the dual eligible variables due to the little impact on measure scores. The developer also conducted a decomposition analysis and reports that each of the variables showed a considerably greater hospital-level effect, compared with the patient-level effect and that any patient-level adjustment alone may also adjust for quality differences between hospitals.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-1; M-5; L-3; I-0).
- The Standing Committee did not raise any other questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 18; H-8; M-10; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 18; H-4; M-14; L-0; I-0**

Rationale:
- The Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the CABG readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 12.7%. They stated that the median RSRR decreased by 0.6 absolute percentage points from July 2016-June 2017 (median RSRR: 12.9%) to July 2018-June 2019 (median: RSRR: 12.3%).
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures
- This measure is related to the following measures:
- NQF #0114 Risk-Adjusted Postoperative Renal Failure
- NQF #0115 Risk-Adjusted Surgical Re-Exploration
- NQF #0119 Risk-Adjusted Operative Mortality for CABG
- NQF #0129 Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
- NQF #0130 Risk-Adjusted Deep Sternal Wound Infection
- NQF #0131 Risk-Adjusted Stroke/Cerebrovascular Accident
- NQF #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization

- NQF #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization
- NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- NQF #2558 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
- NQF #3494 Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery

The developer reported that the measure is harmonized with the above measures to the extent possible given the different data sources used for development and reporting.

- The developer stated that the CABG readmission measure was developed in close collaboration with Society of Thoracic Surgeons (STS). It was developed concurrently with a clinical registry data-based readmission measure (risk-adjusted readmission measure for CABG). The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial Heart Surgery for Atrial Fibrillation (MAZE) procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to differentiate them from open maze procedures. STS measures are specified for age 18 and over, and the CABG readmission measure is currently specified for age 65 and over.
- The developer stated that this measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for CABG). Effort was taken to harmonize both the registry-based and administrative-based measures to the extent possible given the differences in data sources.
- The STS cardiac surgery registry currently enrolls most, but not all, patients receiving CABG surgeries in the U.S. The proposed CABG readmission measure will capture all qualifying Medicare FFS patients undergoing CABG regardless of whether their hospital or surgeon participates in the STS registry. This claims-based CABG readmission measure was developed with the goal of producing a measure with the highest scientific rigor and broadest applicability.

Standing Committee Recommendation for Endorsement: **Total Votes 18; Y-18**; **N-0**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

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All-Cause Admissions and Readmissions Fall 2020 Review Cycle

CSAC Review

June 29-30, 2021

Funded by the Centers for Medicare & Medicaid Services under contract HHSM-500-2017-00060I Task Order HHSM-500-T0001

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Standing Committee Recommendations

- Seven measures reviewed for fall 2020
  - All seven measures reviewed by the Scientific Methods Panel and passed
  - All seven measures recommended for endorsement:
    - 2888 ACO Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions (Yale CORE/CMS) (maintenance)
    - 3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under MIPS (Yale CORE/CMS) (new)
    - 0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) following Heart Failure (HF) Hospitalization (Yale CORE/CMS) (maintenance)
    - 0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) following Acute Myocardial Infarction (AMI) Hospitalization (Yale CORE/CMS) (maintenance)
    - 0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) following Pneumonia Hospitalization (Yale CORE/CMS) (maintenance)
    - 1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate following Chronic Obstructive Pulmonary Disease (COPD) (Yale CORE/ CMS) (maintenance)
    - 2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) following Coronary Artery Bypass Graft (CABG) Surgery (Yale CORE/CMS)(maintenance)

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Overarching Issues

- **Ongoing impact of COVID-19 on healthcare utilization**
  - Emphasis on older adults with multiple chronic conditions that have a higher risk of contracting COVID-19 and of suffering from complications
  - The Standing Committee discussed the increase of unplanned hospital admissions and readmissions for high-risk patients due to COVID-19 and acknowledged its impact on quality measure rates for several measures.
  - May require decisions on whether to risk adjust for or possibly exclude these patients from the measure
- **Reliability Thresholds and Variations by Case Volume**
  - The Standing Committee has recognized the challenge of achieving consensus on acceptable thresholds for measure score reliability statistics.
  - Increasing the case volume would result in a drop in the number of facilities that would be included in the measures.
  - The Standing Committee acknowledged this tradeoff, and that for meaningful measures that assess important serious outcomes, such as mortality or surgical procedures, it might be reasonable to accept a slightly lower reliability in order to capture more low-volume providers.

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Overarching Issues *(continued)*

- **Opportunity for Improvement**
  - The Standing Committee discussed whether several measures have plateaued due to the limited change in measures' rates over time.
  - The Standing Committee acknowledged that there remains a substantial number of hospitals that have room to improve, and there continues to be evidence to support the ability for hospitals to improve.
- **Social Risk Adjustment**
  - The developer tested for certain social risk factors (SRFs) for the risk adjustment model, namely the Agency for Healthcare Research & Quality (AHRQ) Socioeconomic Status (SES) Index and dual eligibility. However, some of the measures under review did not include these SRFs in the final model.
  - The Standing Committee recognized the need to ensure that providers serving people with SRFs are not penalized unfairly by a lack of social risk adjustment. To that regard, CMS commented that it does not adjust for SRFs like dual eligibility at the measure-level.

Public and Member Comment and Member Expressions of Support

- 15 comments received from two commenters, expressing concerns for all seven measures related to:
  - Minimum reliability thresholds
  - Lack of social risk factors within risk adjustment model
  - Opportunity for improvement (except for NQF #3597)
  - Attribution (for NQF #3597 only)
- One NQF member provided expressions of support and non-support for six measures under review
  - Three measures under review received support from one NQF member
    - 0506 Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
    - 2515 Hospital 30-day, All-cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) following Coronary Artery Bypass Graft (CABG) Surgery
    - 2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

Public and Member Comment and Member Expressions of Support *(continued)*

- Three measures under review did not receive support from one NQF member
  - 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
  - 3597 Clinician-Group Risk-Standardized A cute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System

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Questions?

- NQF Project team:
  - Matt Pickering, Senior Director
  - Oroma Igwe, Manager
  - Yemsrach Kidane, Project Manager

- Project webpage: https://www.qualityforum.org/All_Cause_Admissions_and_Readmissions.aspx
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All Cause Admissions and Readmissions, Fall 2020 Cycle: CDP Report

DRAFT REPORT FOR CSAC REVIEW
JUNE 29, 2021

This report is funded by the Centers for Medicare & Medicaid Services under contract HHSM-500-2017-00060I Task Order HHSM-500-T0001.

http://www.qualityforum.org

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Executive Summary

Reducing avoidable hospital admissions and readmissions continues to be an important focus of quality improvement across the healthcare system. Unnecessary hospitalizations can prolong the illness of patients, increase their time away from home and family, expose them to potential harms, and add to their costs. Avoidable admissions and readmissions also significantly contribute to the high rate of healthcare spending in the United States.

To encourage hospitals to reduce preventable readmissions, the Centers for Medicare & Medicaid Services (CMS) created the Hospital Readmission Reduction Program.[1] The program incentivizes hospitals to reduce risk-standardized 30-day readmissions for a variety of conditions, including, but not limited to, acute myocardial infarction (AMI), congestive heart failure (CHF), pneumonia, chronic obstructive pulmonary disease (COPD), and coronary artery bypass graft surgery (CABG).

Currently, there are 38 National Quality Forum (NQF)-endorsed measures in the All-Cause Admissions and Readmissions portfolio, many of which are part of several federal quality improvement programs. Meeting quality goals while ensuring accurate comparisons of performance via use in these accountability programs is integral to the effectiveness of improving care quality. Additionally, as the portfolio grows, and as readmission measures are increasingly used in value-based purchasing programs, the consideration of the opportunity for measure improvement and the impact of social risk factors on hospital admission or readmission will continue to be a focal point for measure evaluation.

The All-Cause Admissions and Readmissions Standing Committee oversees the NQF All-Cause Admissions and Readmissions measure portfolio. The Standing Committee evaluates newly submitted and previously endorsed measures against NQF's measure evaluation criteria, identifies portfolio gaps, provides feedback on gaps in measurement, and conducts ad hoc reviews. On February 12 and 16, 2021, the Standing Committee evaluated one newly submitted measure and six measures undergoing maintenance review. The Standing Committee recommended all measures for endorsement. The recommended measures are listed below:

- NQF #2888 ACO Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions (Yale CORE / CMS)
- NQF #3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions Under MIPS (Yale CORE / CMS)
- NQF #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization (Yale CORE / CMS)
- NQF #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization (Yale CORE / CMS)
- NQF #0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization (Yale CORE / CMS)

- NQF #1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization (Yale CORE / CMS)
- NQF #2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery (Yale CORE / CMS)

Brief summaries of the measures currently under review are included in the body of the report; detailed summaries of the Standing Committee's discussion and ratings of the criteria for each measure are in Appendix A.

Introduction

Potentially preventable hospitalizations are inpatient stays for treating ambulatory care-sensitive conditions that evidence suggests may be avoidable, in part, through timely and high quality primary and preventive care.[2] Reducing unnecessary admissions and readmissions to hospitals has been a major focus of healthcare quality improvement efforts. The Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) estimated that in 2017, there were approximately 3.5 million potentially preventable adult inpatient stays with Medicare patients accounting for approximately two-thirds of potentially preventable stays and related costs.[3] Furthermore, it has been estimated that one in five Medicare beneficiaries are readmitted within 30 days of discharge.[4]

These excess hospitalizations can negatively impact a patient's quality of life. Avoidable admissions and readmissions cause patients prolonged illness and pain, potential unnecessary exposure to harm, loss of productivity, inconvenience, and added cost. Avoidable admissions and readmissions also burden the healthcare system with unnecessary costs. HCUP estimated the hospital costs associated with potentially preventable adult stays totaled $33.7 billion in 2017.[3] The majority of potentially preventable stays and associated costs were for chronic conditions, representing 81 percent ($27.3 billion) of hospital costs associated with potentially preventable adult stays.[3] Additionally, the cost of hospital readmissions is estimated to be in the vicinity of $26 billion annually.[5]

Patients with chronic diseases are at an increased risk of hospital readmissions. Most patients with chronic disease have multiple diseases.[6] They may influence each other, and treatment for one disease may adversely impact the other. Hospital quality also impacts readmission rates for patients with chronic conditions. During this fall 2020 review cycle, the All-Cause Admissions and Readmissions Standing Committee reviewed seven measures for endorsement consideration that focused on admissions and readmissions for patients with chronic disease.

The causes of avoidable admissions and readmissions are complex and multifactorial. Avoidable admissions and readmissions can be related to a lack of care coordination and poor discharge planning. However, environmental, community, and patient-level factors, including sociodemographic factors, can also affect the risk of readmission. The complexity of what causes avoidable admissions and readmissions means that providers across the healthcare continuum including hospitals, skilled nursing facilities, and clinicians in the community must work together to ensure high quality care transitions by improving care coordination across providers and engaging patients and their families.

NQF has actively worked to endorse and recommend the use of healthcare quality performance measures to reduce avoidable admissions and readmissions. The NQF-convened Measure Applications Partnership (MAP) has stressed the importance of measures addressing avoidable admissions and readmissions when it recommends measures for use in federal quality initiative programs. MAP has stressed that measures of readmissions should be part of a suite of measures promoting shared accountability across the healthcare system.

Avoidable admissions and readmissions continue to put an unnecessary burden on patients and on the resources of the healthcare system. Reducing the rates of these events will require all stakeholders to

work together to improve coordination of care between care settings. Performance measurement can provide the necessary information to focus improvement efforts and drive change across the healthcare system.

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

The All-Cause Admissions and Readmissions Standing Committee (Appendix C) oversees NQF's portfolio of All-Cause Admissions and Readmissions measures (Appendix B). This portfolio contains 38 measures: 21 all-cause measures and 17 condition-specific measures.

Table 1. NQF All-Cause Admissions and Readmissions Portfolio of Measures

Accountable Entity	All-Cause	Condition-Specific
Hospital	11	13
Home health	2	0
Skilled nursing facility	4	0
Long-term care facility	1	0
Inpatient rehab facility	1	0
Inpatient psychiatric facility	1	0
Population-based	1	1
Hospital outpatient/ambulatory surgery center	0	2
Accountable care organizations (ACO)	0	1
Total	21	17

Additional measures related to admissions and readmissions may be reviewed by other Standing Committees based on appropriate expertise. These include transition-of-care measures (Patient Experience and Function) and a variety of condition-specific readmissions measures (Renal, Surgery, and Perinatal and Women's Health).

All-Cause Admissions and Readmissions Measure Evaluation

On February 12 and 16, 2021, the All-Cause Admissions and Readmissions Standing Committee evaluated one new measure and six measures undergoing maintenance review against NQF's standard measure evaluation criteria.

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

Measure Status	Maintenance	New	Total
Measures under consideration	6	1	7
Measures recommended for endorsement	6	1	7
Measures withdrawn from consideration (Table 3)	1	0	1

Comments Received Prior to Standing Committee Evaluation

NQF solicits comments on endorsed measures on an ongoing basis through the Quality Positioning System (QPS). In addition, NQF accepts 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 December 17, 2021, and closed on January 21, 2021. As of January 21, 23 comments were submitted and shared with the Standing Committee prior to the measure evaluation meetings (Appendix F).

Comments Received After Standing Committee Evaluation

The continuous 16-week public commenting period with NQF member support closed on April 28, 2021. Following the Standing Committee's evaluation of the measures under review, NQF received 15 comments from two member organizations pertaining to the draft report and to the measures under review. All comments for each measure under review have been summarized in Appendix A.

Throughout the 16-week continuous public commenting period, NQF members had the opportunity to express their support ("support" or "do not support") for each measure submitted for endorsement consideration to inform the Standing Committee's recommendations. One NQF member provided their expression of support.

Overarching Issues

During the Standing Committee's discussion of the measures, several overarching issues emerged that were factored into the Standing Committee's deliberations and recommendations for multiple measures.

Impact of COVID-19

The ongoing COVID-19 pandemic has had an impact on healthcare utilization, especially for older adults with multiple chronic conditions that have a higher risk of contracting COVID-19 and of suffering from complications. More serious cases often require hospital care. The Standing Committee discussed that due to COVID-19, there have been increases in unplanned hospital admissions and readmissions for these high-risk patients. The Standing Committee acknowledged that this will have an impact on quality measure rates for several of the measures, which will require decisions on whether to risk adjust for or possibly exclude these patients from the measure.

Reliability Thresholds and Variations by Case Volume

Variation in reliability due to the number of cases in practices or facilities was a point of discussion by the Standing Committee, as greater variance can be inherent in healthcare facilities (e.g., hospitals) with lower case volume. For several of the measures reviewed this cycle, the Standing Committee raised concerns that the signal-to-noise or split-sample reliability statistics for facilities with small case volumes may not be sufficient for the measure to be considered reliable. For several review cycles, the Standing Committee has recognized the challenge of achieving consensus on acceptable thresholds for measure score reliability statistics. Increasing the case volume would result in a drop in the number of facilities that would be included in the measures. The Standing Committee acknowledged this tradeoff, and that for meaningful measure that assess important serious outcomes, such as mortality or surgical

procedure, it might be reasonable to accept a slightly lower reliability in order to capture more low-volume providers.

Opportunity for Improvement

Under NQF's evaluation criteria, there is increased emphasis on improvement results over time, such that NQF-endorsed measures should demonstrate progress toward achieving the goal of high-quality, efficient healthcare. During this measure review cycle, the Standing Committee discussed whether several measures have plateaued due to the limited change in measures rates over time. The Standing Committee acknowledged that there remains a substantial number of hospitals that have room to improve, and there continues to be evidence to support the ability for hospitals to improve. The Standing Committee discussed that the ability to improve was not solely under the control of the hospital, but rather, it was supplemented by the services provided in the community (e.g., visiting nurses, pharmacies). The Standing Committee recognized that CMS is increasingly incentivizing improvements in readmission rates in other settings and across sectors to promote care coordination with those community services.

Social Risk Adjustment

Resource use measurement is influenced by the care received in a healthcare setting and patient, clinical, and social risk factors (e.g., age, race, ethnicity, gender, social relationships, residential and community context). While the developer did test for certain social risk factors (SRFs) for the risk adjustment model, namely the Agency for Healthcare Research & Quality (AHRQ) Socioeconomic Status (SES) Index and dual eligibility, some of the measures under review did not include these SRFs in the final model. The Standing Committee recognized the need to ensure that providers serving people with SRFs are not penalized unfairly by a lack of social risk adjustment. To that regard, CMS commented that it does not adjust for SRFs like dual eligibility at the measure-level. Rather for the Hospital Readmission Reduction Program, in which most of the measures are currently used, the program stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. It groups the hospitals into five equal groups. And those quintiles are sorted based on percentage of dual eligibility patients. CMS further added that it would take Congressional action to be able to override that.

Summary of Measure Evaluation

The following summaries of the measure evaluation highlight the major issues that the Standing Committee considered. Details of the Standing Committee's discussion and ratings of the criteria for each measure are included in Appendix A. Quorum (at least 16 out of 24 members in attendance) was achieved and maintained during the first web meeting on February 12. During the second web meeting on February 16, quorum was lost for the last measure under review, NQF #2515. Therefore, the Standing Committee discussed all relevant criteria for this measure and voting occurred after the meeting using an online voting tool.

#2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions (Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).; **Measure Type**: Outcome; **Level of Analysis**: Other; **Setting of Care**: Outpatient Services; **Data Source**: Claims, Enrollment Data, Other

The Standing Committee recommended the measure for continued endorsement. The Standing Committee did not raise any concerns related to evidence or performance gap and passed the measure on these criteria. This measure was deemed complex and was evaluated by the NQF Scientific Methods Panel (SMP), which passed with a high rating for reliability and a moderate rating for validity. The Standing Committee did not raise any questions or concerns related to reliability and upheld the SMP's high rating. In reviewing the empirical validity testing, the Standing Committee considered the SMP's review, which raised some concern that four of the five comparator measures hypothesized a weak or poor relationship with the measure, and there was a slightly negative but insignificant correlation with the control of high blood pressure measure (-0.07, p=0.673), which was not hypothesized. The Standing Committee noted that despite these concerns, the SMP passed the measure on validity. The Standing Committee agreed that it was not expected that blood pressure would have a big effect on the admission to the hospital, and the lack of a strong correlation was not suspect. The Standing Committee therefore upheld the SMP's moderate rating for validity. The measure was also regarded as feasible by the Standing Committee. Moving to usability and use, there was some discussion by the Standing Committee on how this measure attributes patients to Accountable Care Organizations (ACOs). The developer clarified that the ACO program has an attribution algorithm that the measure will adopt. Therefore, this is not part of the measure specification, but the attribution decisions are at the program-level. The Standing Committee passed the measure on use and usability. There were two public comments received that the Standing Committee considered in their evaluation of the measure, which questioned the adequacy of the risk model's fit, since the deviance R-squared was only 0.111.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed this information during the measure evaluation meetings and voted to recommend this measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

#3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions Under the Merit-Based Incentive Payment System (Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: Risk-Standardized rate of acute, unplanned hospital admissions among Medicare Fee-for-Service (FFS) patients aged 65 years and older with multiple chronic conditions (MCCs).; **Measure Type**: Outcome; **Level of Analysis**: Clinician : Group/Practice; **Setting of Care**: Outpatient Services; **Data Source**: Claims, Enrollment Data, Other

The Standing Committee recommended the measure for initial endorsement. The Standing Committee discussed the attribution of the measure, seeking clarity as to whether it was different than the previous ACO-level measure (NQF #2888). The developer clarified that for the ACO measure, attribution was conducted at the program-level; whereas, for NQF #3597, the attribution is part of the measure itself. The Standing Committee did not have any concerns with the evidence and observed that there is an appropriate gap in care that warrants this performance measure. The Standing Committee noted that this measure has been evaluated by the SMP and passed with a high rating for reliability and a moderate rating for validity. The Standing Committee discussed the generalizability of the minimum clinician group size threshold of 15 clinicians. The developer commented that CMS makes decisions about the cut points during rulemaking. Further, the Merit-based Incentive Payment System (MIPS) program will not go below a reliability of 0.4, and that there is a balance that CMS is trying to achieve between increasing the number of patients and clinicians captured in the measure versus maintaining a strong reliability score. The Standing Committee recognized that a similar concern regarding the minimum clinician threshold had been discussed by the Standing Committee in the past, specifically for NQF #3495. That measure was bifurcated at a group-level and at an individual clinician-level. The Standing Committee did not approve it at the individual level because the reliability results were too low, but approved it at the group-level because, in that case, the clinician groups had enough patients to show sufficient reliability. The Standing Committee did not raise any further questions and upheld the SMP's rating of high for reliability. There were no concerns regarding the measure's validity and the Standing Committee upheld the SMP's rating of moderate. The measure was also regarded as feasible by the Standing Committee, and there were no concerns about use. The Standing Committee recognized that this measure is not currently publicly reported or used in an accountability application. However, CMS proposes this measure for use within the MIPS program. As a result, the Standing Committee acknowledged that since this is a new measure and not currently in use, there are no year-over-year performance data, nor any unintended consequences from its use. There were two public comments received that the Standing Committee considered in their evaluation of the measure. These comments focused on the following subjects: (1) whether the attribution method was evidence-based, (2) recommending an increase to the minimum sample size to improve the reliability score, and (3) questioning the adequacy of the risk model's fit, since the deviance R-squared was only 0.105.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. Commenters expressed concern that the attribution of this measure may not be reasonable, nor evidence based. The Standing Committee and the NQF Scientific Methods Panel previously considered

the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee acknowledged that it had previously considered the reliability and validity testing, and the attribution approach during the measure evaluation meetings and ultimately recommended the measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

#0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization (Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.; **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims, Enrollment Data, Other

The Standing Committee recommended the measure for continued endorsement. The Standing Committee voted unanimously to pass the measure on the evidence criterion. Moving to performance gap, the Standing Committee discussed whether the 3.4 percent range from the 10th and 90th percentiles was a sufficient gap. The developer commented that this measure is capturing 4,000 hospitals, and in looking beyond the 10th and 90th percentiles, there are still a significant number of hospitals in these extremes. The developer further commented that there has been evidence to show that for hospitals that focus on improving readmissions, they can lower their rates up to 20 percent, and that safety net hospitals were able to improve faster than other hospitals.

The Standing Committee passed the measure with a moderate rating for performance gap. The Standing Committee noted that this measure was reviewed by the SMP, which gave a moderate rating for both reliability and validity. In reviewing the reliability testing for this measure, the Standing Committee noted that the developer conducted an intraclass correlation coefficient for hospitals with 25 or more admissions and found a 0.587 agreement between the two independent assessments of the RSRR for each hospital. A signal-to-noise method was also employed, and the median reliability score was 0.57, ranging from 0.14 to 0.96. The Standing Committee discussed what the appropriate minimum threshold should be for reliability. NQF staff commented that other NQF-convened groups, including the SMP, have discussed this at length. There is not a universal threshold of reliability and the Standing Committee should decide if they are willing to accept the data that are presented. NQF staff further mentioned that measures with reliability scores that are less than 0.7 have been endorsed by this Standing Committee in the past. One Standing Committee member agreed that there is a lack of consensus with reliability thresholds and encouraged CMS to reconsider the case volume cut points for the measure in order to help address these reliability concerns, as sample size can drive reliability. CMS

responded that increasing the case volume would result in a drop in the number of hospitals that would be included in the measure, saying that it is a tradeoff, and that for a measure to assess important serious outcomes such as mortality or surgical procedure, it might be reasonable to accept a slightly lower reliability in order to capture more low-volume providers. The Standing Committee voted to uphold the SMP's rating of moderate for reliability.

For validity, the Standing Committee did raise some concern related to the risk adjustment model, namely that social risk factors (SRF, dual eligibility, and AHRQ SES index) were tested but not included in the final specification. CMS commented that it does not adjust for dual eligibility at the measure level. The Hospital Readmission Reduction Program stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. It groups the hospitals into five equal groups, and those quintiles are sorted based on percentage of dual eligibility patients. CMS further added that it would take Congressional action to be able to override that approach. The Standing Committee ultimately voted to accept the SMP's moderate rating for validity. The Standing Committee identified no concerns regarding the feasibility of this measure or the use and usability as the developer noted the measure is publicly reported in Hospital Compare and used in the Hospital Readmissions Reduction Program. There were two public comments received that the Standing Committee considered in their evaluation of the measure. These comments focused on the following subjects: (1) the statistically significant meaningful difference in performance, questioning whether there is sufficient variation in performance across hospitals, (2) recommending an increase to the minimum sample size to improve the reliability score, and (3) questioning the rationale to exclude social risk factors within the risk adjustment model.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed this information during the measure evaluation meetings and voted to recommend this measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

#0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization (Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.;

Measure Type: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims, Enrollment Data, Other

The Standing Committee recommended the measure for continued endorsement. It agreed that this is an important focus area of measurement and expressed no concern associated with the evidence for the measure and the performance gap and passed the measure on these criteria. The Standing Committee noted that the SMP was not able to reach consensus on reliability for this measure; it therefore provided its own rating on reliability. The Standing Committee acknowledged the pre-evaluation meeting comments that raised concerns related to the minimum case thresholds of 25 cases. Members of the Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to pass the measure on reliability with a moderate rating. The Standing Committee noted that the SMP passed the measure on validity with a moderate rating. The Standing Committee did not raise any major concerns and proceeded to accept the SMP's rating for the validity criterion. The Standing Committee did not have any concerns with the feasibility of the measure. The Standing Committee recognized that this measure is currently in use in Hospital Compare and Hospital Readmissions Reduction Program (HRRP) and passed the measure on the use criterion.

With respect to the usability criterion, the Standing Committee considered that research has explored potential spillover effects of the AMI readmission measures' implementation and reductions in readmissions for non-targeted conditions. The developer stated that several studies support positive spillover effects, as there has been systematic improvement in risk-standardized readmission rates for patients not included in HRRP measures. The Standing Committee held no concerns and passed the measure on the usability criterion.

There were two public comments received that the Standing Committee considered in their evaluation of the measure. These comments focused on the following subjects: (1) the statistically significant meaningful difference in performance, questioning whether there is sufficient variation in performance across hospitals, (2) recommending an increase to the minimum sample size to improve the reliability score, and (3) questioning the rationale to exclude social risk factors within the risk adjustment model.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. Commenters further questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed the reliability and validty testing information during the measure evaluation meetings. The Standing

Committee also acknowledged that there remains a gap in performance due to variations of measures scores and ultimately recommended the measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

#0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization (Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.; **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims, Enrollment Data, Other

The Standing Committee recommended the measure for continued endorsement. It passed the measure unanimously on the evidence criterion. The Standing Committee did not raise any questions or concerns regarding the performance gap and passed the measure with a moderate rating for this criterion. The Standing Committee noted that this measure had been evaluated by the SMP and was given moderate ratings for both reliability and validity. The Standing Committee held some pre-evaluation concerns around the split sample median value of 0.544 median and the low differentiation within the 4,280 hospitals. However, it agreed that these issues of reliability were very similar to those previously discussed for measure NQF #0330. With no additional concerns, the Standing Committee voted to uphold the SMP rating of moderate for reliability. Moving to validity, a Standing Committee member inquired about the adjustment or inclusion of COVID-19-related pneumonia, and the developer responded stating that the sample measurement period was pre-COVID-19 and that CMS is actively working on examining the impact of COVID-19 moving forward. The Standing Committee had no additional questions with respect to the validity of the measure and unanimously accepted the SMP's rating of moderate. The measure was regarded as feasible by the Standing Committee with no concerns.

For use and usability, the Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP. The Standing Committee further acknowledged that there have been no unintended consequences or harms related to the use of this measure and that CMS commissioned an independent panel of statisticians to review all the literature around unintended harm and found no issues. The Standing Committee held no concerns about use and usability and passed the measure on both criteria.

There were two public comments received that the Standing Committee considered in their evaluation of the measure. These comments focused on the following subjects: (1) the statistically significant

meaningful difference in performance, questioning whether there is sufficient variation in performance across hospitals, (2) recommending an increase to the minimum sample size to improve the reliability score, and (3) questioning the rationale to exclude social risk factors within the risk adjustment model.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. Commenters further questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed the reliability and validty testing information during the measure evaluation meetings. The Standing Committee also acknowledged that there remains a gap in performance due to variations of measures scores and ultimately recommended the measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

#1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) hospitalization (Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) 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 and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.; **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims, Enrollment Data, Other

The Standing Committee recommended the measure for continued endorsement. It Committee agreed that this is an important focus area of measurement and passed the evidence and performance gap criteria. The Standing Committee noted that this measure had been evaluated by the SMP and was given moderate ratings for both reliability and validity. The Standing Committee did not have any concerns related to reliability and upheld the SMP's rating of moderate. With respect to validity, the Standing Committee raised some concern with the absence of social risk factors within the risk adjustment model but recognized that this concern was discussed with NQF #0330 measure. Similar to NQF #0506, the Standing Committee discussed that COVID-19 will have a significant impact on this measure, which will

require decisions on whether to risk adjust for or possibly exclude COVID-19-related COPD exacerbation patients from the measure. With no additional questions or concerns raised, the Standing Committee voted unanimously to uphold the SMP's rating of moderate for validity. The measure was regarded as feasible by the Standing Committee with no concerns.

In their discussions related to usability and use, the Standing Committee noted that the measure is used within accountability applications and demonstrates channels for good measure feedback. The Standing Committee discussed whether there is opportunity for improvement due to the 0.1 percent absolute percentage point difference between July 2016 and June of 2017 rates. It agreed that this issue was discussed during NQF #0330 and proceeded to pass the measure on the use criterion and with a moderate rating for the usability criterion.

There were two public comments received that the Standing Committee considered in their evaluation of the measure. These comments focused on the following subjects: (1) the statistically significant meaningful difference in performance, questioning whether there is sufficient variation in performance across hospitals, (2) recommending an increase to the minimum sample size to improve the reliability score, and (3) questioning the rationale to exclude social risk factors within the risk adjustment model.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. Commenters further questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed the reliability and validty testing information during the measure evaluation meetings. The Standing Committee also acknowledged that there remains a gap in performance due to variations of measures scores and ultimately recommended the measure for endorsement. There were no objections from Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

#2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery (Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation [Yale CORE]): Recommended

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older.

An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.; **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims, Enrollment Data

The Standing Committee recommended the measure for continued endorsement. It agreed that this is an important focus area of measurement. A Standing Committee member inquired if the patients in 2014 are different from patients in 2021, specifically if there is anything in the evidence that articulates how the patient population per capita has changed since the introduction of the measure in 2014. The developer commented that it cannot state exactly how the cohort has changed since 2014, but that the measure can withstand cohort shifts. The developer added that the risk adjustment models are updated every year to make sure that if a given risk factor becomes either stronger or weaker in terms of its relevance to readmission, then the measure will adapt accordingly, such as if the cohort is changing.

The Standing Committee unanimously passed the measure on the evidence criterion. It observed that the room for improvement with this measure was slightly wider than previously reviewed measures and passed the measure on performance gap with a rating of moderate. The Standing Committee noted that this measure has been evaluated by the SMP and was given moderate ratings for both reliability and validity. Due to a loss of quorum, the Standing Committee voted offline. It passed the measure on reliability and validity with a rating of moderate. The measure was regarded as feasible by the Committee with no stated concerns. The Committee passed the measure on use unanimously and passed the measure on usability with moderate rating.

There were two public comments received that the Standing Committee considered in their evaluation of the measure. These comments focused on the following subjects: (1) the statistically significant meaningful difference in performance, questioning whether there is sufficient variation in performance across hospitals, (2) recommending an increase to the minimum sample size to improve the reliability score, and (3) questioning the rationale to exclude social risk factors within the risk adjustment model.

During the public comment period, commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume. Commenters also raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. Commenters further questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods. The Standing Committee and the NQF Scientific Methods Panel previously considered the scientific acceptability, including the reliability testing, the risk adjustment model, and the consideration of social risk factors. The Standing Committee agreed that social risk factors, including community and personal factors, can have a strong impact on readmissions and are important to consider. The Standing Committee reviewed the reliability and validty testing information during the measure evaluation meetings. The Standing Committee also acknowledged that there remains a gap in performance due to variations of measures scores and ultimately recommended the measure for endorsement. There were no objections from

Standing Committee members to the developer responses, nor any requests to reconsider or revote on this measure.

Measures Withdrawn From Consideration

One new measure has been withdrawn during the endorsement evaluation process.

Table 3. Measures Withdrawn From Consideration

Measure	Reason for withdrawal
3598: Median Time from ED Arrival to ED Departure for Discharged Patients	The measure steward, CMS, decided to document additional evidence prior to endorsement consideration.

References

1. Hospital Readmissions Reduction Program (HRRP) | CMS. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program. Last accessed March 2021.

2. Prevention Quality Indicators (PQI) Overview. https://www.qualityindicators.ahrq.gov/Modules/pqi_resources.aspx#techspecs. Last accessed March 2021.

3. Characteristics and Costs of Potentially Preventable Inpatient Stays, 2017 #259. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb259-Potentially-Preventable-Hospitalizations-2017.jsp. Last accessed March 2021.

4. Jencks SF, Williams MV, Coleman EA, et al. Rehospitalizations among Patients in the Medicare Fee-for-Service Program. *New England Journal of Medicine*. 2009;360(14):1418-1428.

5. Center for Health Information and Analysis. Performance of the Massachusetts Health Care System Series: A Focus On Provider Quality. January 2015. https://www.chiamass.gov/assets/Uploads/A-Focus-on-Provider-Quality-Jan-2015.pdf.

6. García-Olmos L, Salvador CH, Alberquilla Á, et al. Comorbidity patterns in patients with chronic diseases in general practice. *PLoS One*. 2012;7(2):e32141.

Appendix A: Details of Measure Evaluation

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

Note: Vote totals may differ between measure criteria and between measures as Standing Committee members often have to join calls late or leave calls early. NQF ensures that quorum is maintained for all live voting. All voting outcomes are calculated using the number of Standing Committee members present for that vote as the denominator. Quorum (at least 16 out of 24 members in attendance) was achieved and maintained during the first web meeting on February 12. During the second web meeting on February 16, quorum was lost for NQF #2515—the last measure under review. Therefore, the Standing Committee discussed all relevant criteria for this measure and voting occurred after the meeting using an online voting tool.

Measures Recommended

#2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions

Submission | Specifications

Description: Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).

Numerator Statement: The outcome for this measure is the number of acute unplanned hospital admissions per 100 person-years at risk for admission during the measurement period.

Denominator Statement: Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs).

Attribution:

The outcome is attributed to the ACO to which the patient is assigned. (More details are provided in the next section.)

Person-time at risk

Persons are considered at risk for hospital admission if they are alive, enrolled in Medicare FFS, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.

Exclusions: The measure excludes the following patients:

1. Patients without continuous enrollment in Medicare Part A or B during the measurement period.
2. Patient enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year.
3. Patients without any visits with any of the Taxpayer Identification Numbers(TINs) associated with the attributed ACO during the measurement year or the year prior to the measurement year.
4. Patients not at risk for hospitalization during the measurement year.

Adjustment/Stratification: Statistical Risk Model/ Not applicable. This measure is not stratified.

Level of Analysis: Other

Setting of Care: Outpatient Services

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

1. Importance to Measure and Report: The measure meets the Importance criteria.
(1a. Evidence, 1b. Performance Gap)
1a. Evidence: **Total Votes 20; Pass-20; No Pass-0**; 1b. Performance Gap: **Total Votes 20; H-1; M-17; L-2; I-0**
Rationale:

Evidence

- The Standing Committee reviewed the logic model that suggest that ACOs should be able to impact unplanned admissions through strengthening preventive care, delivering better coordinated and more effective chronic disease management, and providing timely ambulatory care for acute exacerbations of chronic disease.
- The Standing Committee considered several studies provided by the developer suggesting that improvements in the delivery of healthcare services for ambulatory patients with MCCs can lower the risk of admission, including a 2018 Annual ACO Survey, which indicates that the top priorities for ACOs included reducing avoidable emergency department (ED) visits and inpatient admissions, as well as reducing readmissions through better care transitions.
- The Standing Committee unanimously agreed that there is evidence to support the measure and passed the measure on this criterion.

Performance Gap

- The Standing Committee acknowledged that this is an updated measure (see S.3.2 of measure reliability section of Testing Attachment for updates) is currently not in use. The Standing Committee therefore considered testing data provided by the developer for the 2018 calendar year.
- Across ACOs, the developer reported risk-standardized measure scores ranging from 23.6 to 53.3 per 100 person-years, with a median of 38.6 and an interquartile range of 36.4 to 41.5.
- The Standing Committee reviewed the quartiles for the proportion of dual-eligible patients, which were Q1 (0.6-5.9%); Q2 (5.9-9.9%); Q3 (10.0-15.3%); Q4 (15.3-91.5%) with averages of 36.8, 39.5, 39.4 and 39.7, respectively.
- The Standing Committee did not have any major concerns or questions related to performance gap and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.
(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity
2a. Reliability: **Total Votes 19; Yes-19; No-0 (H-7; M-1; L-0; I-0 SMP)**; 2b. Validity: **Total Votes 20; Yes-20; No-0 (H-3; M-3; L-2; I-0 SMP)**

Rationale:

- The Standing Committee noted that this measure was reviewed by the Scientific Methods Panel, which passed the measure on both reliability and validity.

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the median signal-to-noise reliability score was 0.96 for all ACOs with at least one attributed MCC patient (N=559) with an interquartile range of 0.94 to 0.98, calculated using one year of data. A split-half analysis was not provided.
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-7; M-1; L-0; I-0).
- The Standing Committee did not have any questions or concerns and unanimously agreed to uphold the SMP's rating and passed the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that both face validity and empirical validity testing were conducted.
- For face validity, a 10-person Technical Expert Panel (TEP) was convened to provide input as to the conditions, groupings, and risk adjustment modeling. However, a quantitative analysis for face validity was not conducted.
- For empirical validity testing, the Standing Committee noted that the developer evaluated whether performance on the ACO measure was correlated with performance on five other ACO measures that assessed the same domains of quality (i.e., care coordination and management of chronic conditions): ACO1 -*CAHPS Getting Timely Care, Appointments, and Information*; ACO4 -*CAHPS Access to Specialists*; ACO8 -Risk Standardized, *All Condition Readmission*; ACO27 -*Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%); ACO28 -Controlling High Blood Pressure*.
- The Standing Committee considered the SMP's review, which raised some concern that four of the five comparator measures hypothesized a weak or poor relationship with the measure and there was a slightly negative but insignificant correlation with the control of high blood pressure measure (-0.07, p=0.673), which was not hypothesized.
- The Standing Committee noted that despite these concerns, the SMP voted to pass the measure on validity with a moderate rating (H-3; M-3; L-2; I-0).
- The Standing Committee noted that it was not expected that blood pressure would have a big effect on the admission to the hospital, so the lack of a strong correlation wasn't suspect.
- The Standing Committee did not raise any further questions or concerns and ultimately upheld the SMP's decision to pass the measure.

Feasibility: Total Votes 21; H-10; M-11; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 21; Pass-21; No Pass-0** *4b. Usability:* **Total Votes 21; H-3; M-17; L-1; I-0**

Rationale:

- The Standing Committee recognized that this is an updated measure (see S.3.2 of measure reliability section of Testing Attachment for updates) that is not yet in use and that CMS has proposed to include this updated measure in the Alternative Payment Models (APM) Performance Pathway quality measure set to be reported on by Medicare ACOs.
- Further, the Standing Committee acknowledged that this updated measure would replace the original measure in the Medicare Shared Savings Program (MSSP) beginning with Performance Year 2021 if finalized by CMS.
- The Standing Committee emphasized the need for the dissemination of the measure reports to accountable entities to ensure there is continuous feedback and that this measure was effective.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee acknowledged that this is an updated measure that is not currently in use, and therefore, the developer has not identified any potential harms related to the use of this updated measure.
- The Standing Committee questioned whether this measure is usable for quality improvement and whether the Standing Committee is voting on how it is used. The NQF staff provided clarity that the Use criterion looks at whether a measure is being used in an accountability application or for public reporting. Beyond that, the NQF criteria are agnostic to use.
- There was some discussion on how this measure attributes patients to ACOs. The developer mentioned that the ACO program has an attribution algorithm that the measure will adopt. Therefore, this is not part of the measure specification, but the attribution decisions are at the program-level.
- There were no further questions raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to NQF 3597: *Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions Under the Merit-Based Incentive Payment System*.
- The developer states that the measure specifications are harmonized to the extent possible.
- The developer states that the measure differs in the attribution (due to the intent of the CMS program), and that the cohorts, outcomes, and the risk-adjustment models differ accounting for differences in their target populations and measurement settings.

Standing Committee Recommendation for Endorsement: **Total Votes 21; Y-21**; **N-0**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions Under the Merit-Based Incentive Payment System

Submission | Specifications

Description: Risk-Standardized rate of acute, unplanned hospital admissions among Medicare Fee-for-Service (FFS) patients aged 65 years and older with multiple chronic conditions (MCCs).

Numerator Statement: The outcome for this measure is the number of acute admissions per 100 person-years at risk for admission during the measurement period.

Denominator Statement: Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs).

Provider types included for measurement

- Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine; and non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.
- Relevant specialists: Specialists covered by the measure are limited to those who provide overall coordination of care for patients with MCCs and who manage the chronic diseases that put the MCCs patients in the measure at risk of admission. These specialists were chosen with input from our TEP and include cardiologists, pulmonologists, nephrologists, neurologists, endocrinologists, and hematologists/oncologists. However, as indicated below and in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure.

Patient attribution

We begin by assigning each patient to the clinician most responsible for the patient's care. The patient can be assigned to a PCP, a relevant specialist, or can be left unassigned.

- A patient who is eligible for attribution can be assigned to a relevant specialist only if the specialist has been identified as "dominant." A specialist is considered "dominant" if they have two or more visits with the patient, as well as at least two more visits than any PCP or other relevant specialist. For example, if a patient saw a cardiologist four times in the measurement year, a PCP twice, and a nephrologist twice, the patient would be assigned to the cardiologist, having met the definition of "dominant" specialist. Note: Hematologists and oncologists are considered relevant specialists as they could be expected to manage MCCs patients' care, especially during periods of acute cancer treatment. However, as indicated below in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure.
- There are two scenarios where a patient can be assigned to a PCP. First, the patient must have seen at least one PCP. The patient will then be assigned to the PCP with the highest number of visits as long as there is no relevant specialist who is considered "dominant." Second, if the patient has had more than one visit with a relevant specialist but no "dominant" specialist has been identified, and has two or more visits with a PCP, they will be assigned to that PCP.
- Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no "dominant" specialist can be identified, or if the patient has not had more than one visit with any individual PCP.

Patients are then assigned at the TIN level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN.

- At the TIN level, patients are first assigned to the clinician (unique National Provider Identifier (NPI)/TIN combination since a given provider can be affiliated with more than one TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above) and then patients "follow" their clinician to

the TIN designated by the clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level.

(Note that an alternative attribution approach was considered and assessed as described in section 2b.3.11 of the testing attachment and in Appendix C of the attached methodology report.)

Person-time at risk

Persons are considered at risk for hospital admission if they are alive, enrolled in Medicare FFS, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.

Exclusions: We exclude patients from the cohort for these reasons:

1. Patients without continuous enrollment in Medicare Part A or B during the measurement period.
2. Patients enrolled in hospice at any time during the year prior to the measurement year or at start of the measurement year.
3. Patients with no E&M visit to a MIPS eligible clinician.
4. Patients assigned to clinicians who do not participate in the Quality Payment Program (QPP) on the MIPS track.
5. Patients attributed to hematologists and oncologists.
6. Patients not at risk for hospitalization during the measurement year.

Adjustment/Stratification: Statistical Risk Model/ N/A. This measure is not stratified.

Level of Analysis: Clinician : Group/Practice

Setting of Care: Outpatient Services

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/12/2021

1. Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 19; Pass-19; No Pass-0**; 1b. Performance Gap: **Total Votes 20; H-6**; **M-13**; **L-1**; **I-0**

Rationale:

Evidence

- The Standing Committee considered a logic model depicting that outpatient providers can decrease the rate of hospital admissions for patients with MCCs by providing improved care coordination and continuity of care.
- The Standing Committee also considered several studies that support the assertion that ambulatory care clinicians can influence admission rates through quality of care. Some examples listed in literature included supplementing patient telephone calls with in-person meetings; occasionally meeting in person with providers; acting as a communication hub for providers; providing patients with evidence-based education; providing strong medication management; and providing comprehensive and timely transitional care after hospitalizations.
- The Standing Committee discussed the attribution of the measure, seeking clarity as to whether it was different than the previous ACO-level measure (NQF #2888). The developer commented that for the ACO measure, attribution was conducted at the program level; whereas, with NQF #3597, the attribution is part of the measure itself. It was built and tailored, specifically for the measure, by engaging an expert panel and frontline clinicians.

- The Standing Committee unanimously agreed that there is evidence to support the measure and passed the measure on this criterion.

Performance Gap

- The Standing Committee reviewed the performance gap results.
- Across all provider TINs, in 2018, with at least one attributed MCC patient, the risk-standardized acute admission rate (RSAAR) measure scores ranged from 17.5 to 131.5 per 100 person-years, with a median of 38.7 and an interquartile range of 36.5 to 41.8. The mean RSAAR and standard deviation were 39.5 ± 5.8 admissions per 100 person-years.
- Regarding the disparities, the Standing Committee considered the rate ratios and 95% confidence intervals of 1.08 (1.07, 1.08) for the AHRQ SES variable and 1.04 (1.04, 1.05) for the specialist density variable.
- The Standing Committee did not have any major concerns or questions related to performance gap and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 18; Yes-15; No-3 (H-5; M-2; L-0; I-1 SMP)**; 2b. Validity: **Total Votes 18; Yes-17; No-1 (H-0; M-7; L-1; I-0 SMP)**

Rationale:

- The Standing Committee noted that this measure was reviewed by the Scientific Methods Panel, which passed the measure on both reliability and validity.

Reliability

- The Standing Committee considered the reliability testing for this measure, noting a mean and median signal-to-noise reliability for the MIPS MCC measure of 0.453 and 0.451, respectively (range 0.038-0.999, interquartile range (IQR) 0.190-0.694). These results were for all MIPS TINs with at least one attributed MCC patient.
- After applying a case minimum of 18 MCC patients per clinician group and the group size threshold of >15 clinicians per group, mean and median reliability for 4,044 TINs was 0.809 and 0.873, respectively (range 0.413-0.999, IQR 0.683-0.961)
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-5; M-2; L-0; I-1).
- The Standing Committee discussed the minimum threshold of 15 clinicians in a group and questioned how generalizable this measure will be, as one Standing Committee member from the American Academy of Family Physicians noted that their average clinician group size is six with a median of three.
- The developer commented that it is the volume of patients per TIN that drives reliability and that CMS makes these decisions about the cut points during rulemaking. Further, the MIPS program will not go below a reliability of 0.4, and there is a balance that CMS is trying to achieve

between increasing the number of patients and clinicians captured in the measure versus maintaining a strong reliability score.

- The Standing Committee recognized that a similar concern regarding the minimum clinician threshold that had been discussed by the Standing Committee in the past, specifically NQF #3495. That measure was bifurcated at a group level and at an individual clinician level. The Standing Committee did not approve it at the individual level because the reliability results were too low, but approved it at the group-level because, in that case, the clinician groups had enough patients to show sufficient reliability.
- The Standing Committee did not have any further questions or concerns and ultimately agreed to uphold the SMP's rating and passed the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that only face validity was conducted.
- For face validity, the developer convened a TEP to provide input as to the conditions, groupings, and risk adjustment modeling. Public commenting was also requested. A survey of the TEP showed 83 % of respondents agreed that the MIPS MCC admission measure can be used to distinguish good from poor quality of care. Of 11 member assessing ability to distinguish good from poor, five of 11 somewhat agreed, five moderately agreed, and one strongly disagreed.
- The Standing Committee reviewed the risk adjustment model, which included 49 variables (47 demographic and clinical variables and two social risk factors). The Standing Committee recognized that the model was built off work done for the ACO MCC admission measure. Social risk factors included in the model were low AHRQ SES index and low physician-specialist density.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-7; L-1; I-0). Further, since the developer only conducted face validity, the Standing Committee acknowledged that the highest rating for validity is a "moderate" rating.
- The Standing Committee did not raise any questions or concerns and voted to uphold the SMP's decision to pass the measure.

Feasibility: Total Votes 18; H-8; M-9; L-1; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-17; No Pass-1** *4b. Usability:* **Total Votes 18; H-0; M-14; L-4; I-0**

Rationale:

- The Standing Committee recognized that this measure is not currently publicly reported or used in an accountability application. CMS proposes this measure for use under the MIPS.

- The Standing Committee recognized that MAP conditionally supported the measures pending NQF endorsement for MSSP but provided a "do not support" for the MIPS program, with potential for mitigation. Those areas of mitigation included that 1) the measure should apply to clinician groups, not to individual clinicians. This recommendation was partly driven by reliability results and partly by concerns that individual clinicians may lack the necessary resources and structural supports to effectively reduce the risk of admissions among their MCC patients compared with larger groups of clinicians. 2) The measure should use a higher reliability threshold, (e.g., 0.7). 3) The measure developer should consider the NQF guidance on attribution and consider patient preference and selection as a method of attribution as that date becomes available. 4) The measure should undergo the NQF endorsement process.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee acknowledged that since this is a new measure and not currently in use, there is no year over year performance data. Furthermore, the developer has not provided any information on potential harms.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to NQF #2888 *Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions*.
- The developer states that the measure specifications are harmonized to the extent possible. The only differences are for the CMS programs and measurement levels for which they are intended: For example, the MIPS measure is attributed and scored for clinician groups under MIPS, and the ACO MCC admission measure is attributed and scored for Medicare ACOs.

Standing Committee Recommendation for Endorsement: **Total Votes 19; Y-17**; **N-2**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters expressed concern that the attribution of this measure may not be reasonable, nor evidence based.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization

Submission | Specifications

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who

are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65 and older. 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.

Additional details are provided in S.5 Numerator Details.

Denominator Statement: The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details

Exclusions: The 30-day HF readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
2. Discharged against medical advice (AMA);
3. Admitted within 30 days of a prior index admission for HF; and
4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

1. Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 17; Pass-17; No Pass-0**; 1b. Performance Gap: **Total Votes 16; H-1**; **M-12**; **L-3**; **I-0**

Rationale:

Evidence

- The Standing Committee considered a logic model connecting care processes and elements of patient care with patient outcomes.
- The Standing Committee also reviewed the updated evidence since the measure's last endorsement review, which included a report that found transitional care models that prioritize effective collaboration and communication within and across providers/facilities demonstrate significant hospital readmissions reductions after AMIs.
- The Standing Committee unanimously agreed that there is evidence to support the measure and passed the measure on this criterion.

Performance Gap

- The Standing Committee reviewed the performance gap results.
- During the measurement period of July 2016-June 2019, heart failure readmission rates ranged from a minimum of 16.7% to a maximum of 31.2%, with the 10th percentile at 20.3%, the 50th percentile at 21.9%, and the 90th percentile at 23.7%
- Regarding disparities, performance scores were provided (using July 2016 -June 2019 data) for hospitals by proportion of dual eligible patients and performance scores for hospitals according to proportion of patients with AHRQ SES Index Score in the lower and upper social risk quartiles.
- The Standing Committee discussed whether the 3.4% range from the 10th and 90th percentiles was a sufficient gap. The developer commented that this measure is capturing 4,000 hospitals, and in looking beyond the 10th and 90th percentiles, there are still a significant number of hospitals in these extremes.
- One Standing Committee member questioned whether hospitals are stable within that range or if they can they move around if they change what they are doing. Another Standing Committee member commented that hospitals are spending a lot of money to mitigate risk of readmission and may not be seeing much improvement.
- The developer commented that there has been evidence to show that for hospitals that focus on improving readmissions can lower their rates up to 20%, and that safety net hospitals were able to improve faster than other hospitals.
- One Standing Committee commented that hospitals should stratify this type of measure by race, ethnicity, language spoken, etc. to identify improvement opportunities.
- The Standing Committee did not have any other questions related to performance gap and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

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

2a. Reliability: **Total Votes 17; Yes-15; No-2 (H-0; M-7; L-1; I-0 SMP)**; 2b. Validity: **Total Votes 17; Yes-14; No-3 (H-2; M-5; L-1; I-0 SMP)**

Rationale:

- The Standing Committee noted that this measure was reviewed by the Scientific Methods Panel, which passed the measure on both reliability and validity.

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted an intraclass correlation coefficient for hospitals with 25 or more admissions and found a 0.587 agreement between the two independent assessments of the RSRR for each hospital. A signal-to-noise method was also employed, and the median reliability score was 0.57, ranging from 0.14 to 0.96. The 25th and 75th percentiles were 0.31 and 0.75, respectively.
- The Standing Committee acknowledged the public comments received prior to the measure evaluation meeting from the American Medical Association, raising concern the measure does not meet a minimum reliability score of 0.7.

- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-0; M-7; L-1; I-0).
- The Standing Committee discussed what the appropriate minimum threshold should be for reliability. NQF staff commented that other NQF-convened groups, including the SMP, have discussed this at length. There really is not a universal threshold of reliability and that the Standing Committee should decide if they are willing to accept the data presented. NQF staff further mentioned that measures with reliability scores that are less than 0.7 have been endorsed by this Standing Committee in the past.
- One Standing Committee member agreed that there is a lack of consensus with reliability thresholds. The Standing Committee member encouraged CMS to reconsider the case volume cut points for the measure in order to help address these reliability concerns, as sample size can drive reliability.
- CMS responded that increasing the case volume would result in a drop in the number of hospitals that would be included in the measure. It is a tradeoff, and that for meaningful measure that assess important serious outcomes such as mortality or surgical procedure, it might be reasonable to accept a slightly lower reliability in order to capture more low-volume providers.
- The Standing Committee did not have any further questions and ultimately agreed to uphold the SMP's rating and passed the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted empirical validity testing at the score level using three external hospital quality measures: Hospital Star Rating readmission group score; Overall Hospital Star Rating; and HF Excess Days in Acute Care (EDAC).
- The Standing Committee acknowledged that the results aligned with the developer's predictions. Correlation between HF RSRRs and Star-Rating readmissions score: - 0.585. The correlation between HF RSRRs and Star-Rating summary score: -0.378. The correlation between HF RSRRs and HF EDAC scores: 0.574
- The Standing Committee reviewed the risk adjustment model, which included 37 risk factors; social risk factors (SRF, dual eligibility, and ASPE SES index) were tested but not included in the final specification.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-2; M-5; L-1; I-0).
- Regarding risk adjustment, CMS commented that CMS does not adjust for dual eligibility at the measure level for the Hospital Readmission Reduction Program, adding that the program stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. It groups the hospitals into five equal groups. And those quintiles are sorted based on percentage of dual eligibility patients. CMS further added that it would take Congressional action to be able to override that.

- Additionally, CMS does provide detailed information around stratification of the measures so that hospitals can see how well they are doing for dual-eligibles compared to all other hospitals caring for dual-eligibles, and the gap between dual-eligibles and non-dual-eligibles.
- The Standing Committee did not raise any questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 18; H-7; M-10; L-1; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 17; Pass-17; No Pass-0** *4b. Usability:* **Total Votes 16; H-0; M-14; L-2; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently in use in Hospital Compare and Hospital Readmissions Reduction Program.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median HF 30-day, all-cause, RSRR for the HF readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 21.9 %. The median RSRR increased by 0.1 absolute percentage points from July 2016-June 2017 (median RSRR: 21.8%) to July 2018-June 2019 (median: RSRR: 21.9%).
- The Standing Committee discussed whether this measure has plateaued due the limited change in measures rates over time. The developer commented there is still a substantial number of hospitals that appear to have room to improve, and there continues to be evidence to support the ability to improve.
- The Standing Committee also mentioned that the ability for a hospital to impact this measure was not under the control of the hospital, but rather, it was the services provided in the community (e.g., visiting nurses, pharmacies). Another point to consider is that certain communities may not have those needed services due to resource constraints.
- The developer commented that CMS is increasingly incentivizing improvements in readmission rates in other settings and across sectors to promote care coordination with those community services. Additionally, the developer stated that there have been a number of studies suggesting that safety net hospitals have actually been improving on this measure, quicker than other hospitals.
- The Standing Committee questioned whether there has been an increase in mortality as readmission rates for heart failure decreased. CMS responded stating that this is taken very seriously. CMS cited a MedPAC study from 2018 and also commissioned an independent study to assess this, and there has been no systematic evidence in terms of increased mortality.

- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
  - NQF #0229 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization
  - NQF #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization
  - NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
  - NQF #1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
  - NQF #2879 Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data
  - NQF #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)
  - NQF #2886 Risk-Standardized Acute Admission Rates for Patients With Heart Failure
  - NQF #2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions
- The developer indicated that all measure specifications have been harmonized to the furthest extent possible.
- The developer did not include non-outcome (e.g., process) measures with the same target population as NQF #0330 in its list of related measures. The developer noted the patient exclusion limitations of non-outcome measures and explained that clinical coherence of the cohort takes precedence over alignment with related non-outcome measure.

Standing Committee Recommendation for Endorsement: **Total Votes 16; Y-16**; **N-0**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization

Submission | Specifications

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30

days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Additional details are provided in S.5 Numerator Details.

Denominator Statement: The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.7 Denominator Details.

Exclusions: The 30-day AMI readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
2. Discharged AMA;
3. Same-day discharges; or
4. Admitted within 30 days of a prior index admission for AMI.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence: **Total Votes 17; Pass-17; No Pass-0**; 1b. Performance Gap: **Total Votes 18; H-3**; **M-14**; **L-1**; **I-0**

Rationale:

Evidence:

- The Standing Committee considered the evidence in which the developer reviewed 264 articles related to readmissions following an AMI admission, noting that there were interventions that can be implemented to improve readmission rates.
- The Standing Committee did not raise any questions or concerns and passed the measure on Evidence.

Performance Gap

- The Standing Committee reviewed the performance gap results.
- During the measurement period of July 2016 through June 2019, the developer tested the measure across 4,074 hospitals and 482,163 admissions. Acute Myocardial Infarction readmission rates ranged from a minimum of 11.5% to a maximum of 22.9%, with the 10th percentile at 15.3%, the 50th percentile at 16.1%, and the 90th percentile at 17.1%.
- Regarding disparities, the Standing Committee considered data (sources include Medicare FFS claims, VA claims and Medicare Beneficiary Summary File (MBSF) data) that suggested there are

performance disparities based on dual-eligible status, which the developer supported with literature demonstrating differential healthcare and health outcomes among dual-eligible patients.
- The Standing Committee did not raise any questions or concerns and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.
(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity
2a. Reliability: **Total Votes 17; H-0; M-11; L-4; I-2**; 2b. Validity: **Total Votes 17; Yes-16; No-1 (H-0; M-5; L-4; I-0 SMP)**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted split sample (i.e., test-retest) method to measure the extent of agreement between two independent assessments of the RSRR. Using a combined 2016-2019 sample of 482,163 admissions, the developer calculated an intraclass correlation coefficient (ICC) of 0.424 for hospitals with 25 admissions or more. Additionally, a signal-to-noise method was employed for each hospital with at least 25 admissions. The median reliability score was 0.51, ranging from 0.14 to 0.91. The 25th and 75th percentiles were 0.33 and 0.66, respectively.
- The Standing Committee considered the SMP review of this measure and noted that the SMP did not reach consensus for reliability (H-0; M-5; L-4 I-0).
- The Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to pass the measure on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted validity testing at the performance measure score level by assessing AMI readmission scores correlation with other measures that target the same domain of quality for the same or similar populations. Hospital Star Rating readmission group score; Overall Hospital Star Rating; and AMI EDAC
- The results aligned with the developer's predictions: Correlation between AMI RSRRs and Star-Rating readmissions score: - 0.413; The correlation between AMI RSRRs and Star-Rating summary score: -0.266; The correlation between AMI RSRRs and AMI EDAC scores: 0.425.
- The Standing Committee reviewed the risk adjustment model, which included 31 risk factors; social risk factors (SRF, dual eligibility, and AHRQ SES index) were tested but not included in the final specification. The Standing Committee acknowledged that the developer reported that adjusting for social risk factors had little impact on hospital-level measure scores.

- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-8; L-1; I-0).
- The Standing Committee did not raise any questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 17; H-7; M-10; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 18; H-0; M-15; L-3; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently in use in Hospital Compare and Hospital Readmissions Reduction Program.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the AMI readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 16.1%. The median RSRR decreased by 0.6 absolute percentage points from July 2016-June 2017 (median RSRR: 16.3%) to July 2018-June 2019 (median: RSRR: 15.7%).
- The Standing Committee considered that research has also explored potential spillover effects of the AMI readmission measures' implementation and reductions in readmissions for non-targeted conditions. The developer states that several studies support positive spillover effects, as there has been systematic improvement in risk-standardized readmission rates for patients not included in HRRP measures.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
    - NQF #0230 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI) Hospitalization
    - NQF #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
    - NQF #0730 Acute Myocardial Infarction (AMI) Mortality Rate
    - NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - NQF #2431 Hospital-Level, Risk-Standardized Payment Associated With a 30-Day Episode-of-Care for Acute Myocardial Infarction (AMI)

- NQF #2473 Hybrid Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI)
- NQF #2879 Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data
- NQF #2881 Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)
- Non-NQF endorsed – NQF #0698: 30-Day Post-Hospital AMI Discharge Care Transition Composite Measure (Measure Steward: Centers for Medicare and Medicaid Services)

- The developer indicated that all measure specifications have been harmonized to the furthest extent possible.
- The developer did not include non-outcome (e.g., process) measures with the same target population as NQF 0330 in its list of related measures. The developer noted the patient exclusion limitations of non-outcome measures and explained that clinical coherence of the cohort takes precedence over alignment with related non-outcome measure.

Standing Committee Recommendation for Endorsement: **Total Votes 16; Y-14**; **N-2**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

Submission | Specifications

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Denominator Statement: The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.

Exclusions: The 30-day pneumonia (PN) readmission measure excludes index admissions for patients:

1. AMA;
2. Without at least 30 days post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
3. Admitted within 30 days of a prior index admission for pneumonia.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

1a. Evidence **Total Votes 16; Pass-16; No Pass-0**; 1b. Performance Gap: **Total Votes 16; H-0**; **M-14**; **L-2**; **I-0**

Rationale:

Evidence:

- The Standing Committee considered the updated evidence in which the developer cited evidence that showed Transitions Across Care Settings (TRACS) as one example of how transitional care models focusing on coordination decrease the risk of readmission within 30 days of hospital discharge. Researchers were able to reduce pneumonia readmissions by 4.4%. The overall readmission rate for 104 patients in the pilot TRACS program was 4.8% with 4.4% of for pneumonia.
- The Standing Committee did not raise any questions or concerns and passed the measure on Evidence.

Performance Gap

- The Standing Committee reviewed the performance gap results. The developer provided data showing variation in readmission rates in data from July 1, 2016 to June 30, 2019 Medicare claims and Veteran Affairs (VA) administrative data (n= 1,374,891 admissions from 4,697

hospitals). The three-year hospital-level risk standardized readmission rates (RSRRs) had a mean of 16.7% and a min-max range of 13.1-24.3% in the study cohort.
- The developer provided data from Medicare FFS claims, VA data, and MBSF from July 2016 through June 2019 showing the variation in RSRRs across hospitals (with at least 25 cases) by proportion of patients with social risk.
- The Standing Committee did not raise any questions or concerns and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.
(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity
2a. Reliability: **Total Votes 17; Yes-17; No-0 (H-1; M-7; L-1; I-0 SMP);** 2b. Validity: **Total Votes 17; Yes-17; No-0 (H-0; M-8; L-1; I-0 SMP)**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted score-level testing using signal-to-noise reliability testing and intra-class correlation coefficient (ICC). The developer reported signal-to-noise reliability scores ranging from 0.13 to 0.96, with a mean of 0.53, median of 0.56 and an interquartile range of 0.34 and 0.73, respectively.
- The ICC of 0.544 was calculated using a split sample (i.e., test-retest) method.
- The SMP reviewed this measure for reliability and passed the measure with a high rating (H-1; M-7; L-1; I-0).
- The Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to uphold the SMP rating on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer utilized a validation approach that compared the 30-day pneumonia readmission measure results against the Hospital Star Rating readmission domain and summary scores as well as the pneumonia EDAC after hospitalization for pneumonia measure.
- The correlation between pneumonia RSRRs and Star-Rating readmissions score is -0.564, which led the developer to suggest that hospitals with lower Pneumonia RSRRs are more likely to have higher Star-Rating readmission scores.
- Pneumonia RSRRs and Star-Rating summary score is -0.371, which led the developer to suggest that hospitals with lower pneumonia RSRRs are more likely to have higher Star-Rating summary scores.
- Pneumonia RSRRs and pneumonia EDAC scores is 0.625, which led the developer to suggest that hospitals with lower pneumonia RSRRs are more likely to have lower Pneumonia EDAC scores.

- The Standing Committee reviewed the risk adjustment model, which included 41 risk factors, assessing model performance with discrimination and calibration statistics.
- The Standing Committee acknowledged that developer did not adjust for the low AHRQ SES or the dual eligible variables due to the little impact on measure scores. The developer also conducted a decomposition analysis and reports that each of the variables showed a considerably greater hospital-level effect, compared with the patient-level effect and that any patient-level adjustment alone may also adjust for quality differences between hospitals.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-8; L-1; I-0).
- The Standing Committee discussed the impact of COVID-19-related pneumonia for this measure and whether that was adjusted for within the model. The developer commented that testing data for this measure was pre-COVID-19 and not currently in the risk adjustment model. However, CMS is actively working on looking at the impact of COVID-19 going forward.
- The Standing Committee did not raise any other questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 17; H-4; M-13; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** 4b. Usability: **Total Votes 19; H-0; M-15; L-3; I-1**

Rationale:

- The Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the pneumonia readmission measure for the three-year period between July 1, 2016 and June 30, 2019 of 16.6% that increased by 0.2 absolute percentage points from July 2016-June 2017 (median RSRR: 16.5%) to July 2018-June 2019 (median: RSRR: 16.7%).
- The Standing Committee acknowledged that there have been no unintended consequences or harms related to the use of this measure, and that CMS commissioned an independent panel of statisticians to review all the literature around unintended harm and found no issues. This was also supported the MedPAC reports that came out.
- The Standing Committee underscored that COVID-19 will have a significant impact on this measure, which will require decisions on whether to risk adjust for or possibly exclude these patients from the measure.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
    - NQF #0231 Pneumonia Mortality Rate (IQI #20)
    - NQF #0279 Community Acquired Pneumonia Admission Rate (PQI 11)
    - NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - NQF #2579 Hospital-level, Risk-Standardized Payment Associated With a 30-Day Episode of Care for Pneumonia (PN)
    - NQF #2882 Excess Days in Acute Care (a) After Hospitalization for Pneumonia
- The developer states that these measures are not completely harmonized.
- The developer did not list any non-outcome (e.g., process) measures with the same target population as their measure. Since this is an outcome measure, the developer asserted that clinical coherence of the cohort takes precedence over alignment with related non-outcome measures, which are also limited due to broader patient exclusions.

1. **Standing Committee Recommendation for Endorsement**: **Total Votes 17; Y-16**; **N-1**
2. **Public and Member Comment**
    - Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
    - Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
    - Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization

Submission | Specifications

Description: The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) 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 and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Numerator Statement: The outcome for this 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 the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Denominator Statement: The cohort includes admissions for patients aged 65 or older who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.9 Denominator Details.

Exclusions: The 30-day COPD readmission measures exclude index admissions for patients:

1. Without at least 30 days post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);
2. Discharged AMA; and,
3. Admitted within 30 days of a prior index admission for COPD.

Adjustment/Stratification: Statistical Risk Model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome

Data Source: Claims, Enrollment Data, Other

Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

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

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

Rationale:

Evidence:

- The Standing Committee considered the logic model depicting that the risk of readmission can be decreased by delivering timely, high-quality care; reducing the risk of infection and other complications; ensuring the patient is ready for discharge; improving communication among providers involved at care transition, reconciling medications; educating patients about symptoms, whom to contact with questions, and where/when to seek follow-up care; and encouraging strategies that promote disease management
- The Standing Committee further considered evidence of integrated care management after hospitals discharge, which has suggested clinical benefit.
- The Standing Committee did not raise any questions or concerns and passed the measure on Evidence.

Performance Gap

- The Standing Committee reviewed the performance gap results. The developer provided Medicare claims and Veteran Affairs (VA) administrative data (n= 825,497 admissions from 4,643 hospitals) data showing variation from July 1, 2016 to June 30, 2019 in hospital-level RSRRs. There was a mean of 19.6 % and range from 15.5-26.8% in the study cohort. As shown below, the median risk-standardized rate is 19.6%.

- The developer provided Medicare FFS claims, VA data, and MBSF data from July 2016 through June 2019 showing variation in RSRRs across hospitals (with at least 25 cases) by proportion of patients with social risk.
- The Standing Committee did not raise any questions or concerns and passed the measure on this criterion.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.
(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity
2a. Reliability: **Total Votes 17; Yes-17; No-0 (H-1; M-4; L-3; I-0 SMP);** 2b. Validity: **Total Votes 17; Yes-17; No-0 (H-0; M-6; L-2; I-0 SMP)**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure, noting that the developer conducted score-level testing using split-sample reliability testing, calculating an intraclass correlation coefficient of 0.406. The developer also conducted signal-to-noise reliability testing, reporting signal-to-noise reliability scores ranging from 0.11 to 0.90, a median of 0.43 demonstrating moderate agreement. The interquartile range is 0.34 and 0.73.
- The SMP reviewed this measure for reliability and passed the measure with a moderate rating (H-1; M-4; L-3; I-0).
- The Standing Committee agreed that these issues of reliability thresholds were very similar to those previously discussed for measure NQF #0330 and voted to uphold the SMP rating on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted empirical validity testing at the measure score level. Correlations were reported for COPD RSRRs and Star Rating Readmissions score, which was -0.442. This led the developer to suggest that hospitals with lower COPD RSRRs are more likely to have higher Star Rating Readmission scores. COPD RSRRs and Star Rating summary score was -0.286, which led the developer to suggest that hospitals with lower COPD RSRRs are more likely to have higher Star Rating summary scores.
- The Standing Committee reviewed the risk adjustment model, which included 40 risk factors, assessing model performance with discrimination and calibration statistics.
- The Standing Committee acknowledged that the developer did not adjust for the low AHRQ SES or the dual eligible variables due to the little impact on measure scores. The developer also conducted a decomposition analysis and reports that each of the variables showed a considerably greater hospital-level effect, compared with the patient-level effect and that any patient-level adjustment alone may also adjust for quality differences between hospitals.

- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-0; M-6; L-2; I-0).
- Similar to NQF #0506 discussions, the Standing Committee discussed that COVID-19 will have a significant impact on this measure, which will require decisions on whether to risk adjust for or possibly exclude these patients from the measure.
- The Standing Committee did not raise any other questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 18; H-5; M-11; L-2; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 18; H-0; M-16; L-2; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the COPD readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 19.6 %. The median RSRR increased by 0.1 absolute percentage points from July 2016-June 2017 (median RSRR: 19.5%) to July 2018-June 2019 (median: RSRR: 19.6%)
- The Standing Committee acknowledged that the developer expected an increase in the observed COPD readmission rate between 2017-2018 due to a worse than normal flu season, though flu severity was moderate from 2018-2019 (CDC).
- The Standing Committee considered that there have been no unintended consequences or harms related to the use of this measure.
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
    - NQF #0275 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)
    - NQF #0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
    - NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - NQF #1893 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
    - NQF #2879 Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data

- NQF #2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients With Multiple Chronic Conditions

- The developer states that the measure is harmonized to the fullest extent with these measures.
- The developer did not list any non-outcome (e.g., process) measures with the same target population as their measure. Since this is an outcome measure, the developer asserted that clinical coherence of the cohort takes precedence over alignment with related non-outcome measures, which are also limited due to broader patient exclusions.

Standing Committee Recommendation for Endorsement: Total Votes 18; Y-17; **N-1**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

#2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery

Submission | Specifications

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older.

An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.

Numerator Statement: The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.

Denominator Statement: The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.

Exclusions: For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions:

1. Without at least 30 days post-discharge enrollment in Medicare FFS
2. Discharged AMA
3. Admissions for subsequent qualifying CABG procedures during the measurement period

Adjustment/Stratification: Statistical risk model/ N/A

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Outcome
Data Source: Claims, Enrollment Data
Measure Steward: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING 02/16/2021

Importance to Measure and Report: The measure meets the Importance criteria.

(1a. Evidence, 1b. Performance Gap)
1a. Evidence: **Total Votes 16; Pass-16; No Pass-0**; 1b. Performance Gap: **Total Votes 16; H-5**; **M-11**; **L-0**; **I-0**
Rationale:

Evidence:

- The Standing Committee agreed that this is an important focus area of measurement and acknowledged the inclusion of a logic model depicting a connection between quality of care and interventions such as improved discharge planning, reconciling patient medications, and improved communication with outpatient providers to reduced admission rates.
- A Standing Committee member inquired if the patients in 2014 are different from patients in 2021, specifically if there is anything in the evidence that articulates how the patient population per capita has changed since the introduction of the measure in 2014.
- The developer commented that it cannot state exactly how the cohort has changed since 2014, but the measure can withstand cohort shifts. The developer added that the risk adjustment models are updated every year to make sure that if a given risk factor becomes either stronger or weaker in terms of its relevance to readmission, then the measure will adapt accordingly if the cohort is changing.
- The Standing Committee unanimously passed the measure on the evidence criterion.

Performance Gap

- The Standing Committee reviewed the performance gap results. The developer provided data showing variation in readmission rates in data from July 1, 2016 to June 30, 2019 Medicare claims data (n=131,592 admissions from 1,160 hospitals) and VA administrative data. The three-year hospital-level risk standardized readmission rates (RSRRs) have a mean of 12.8% and a range of 8.6% - 22.6% in the study cohort. The median RSRR is 12.7%.
- The developer provided data from Medicare FFS claims and MBSF from July 2016 through June 2019 showing the variation in RSRRs across hospitals (with at least 25 cases) by proportion of patients with social risk.
- The Standing Committee observed that the room for improvement with this measure was slightly wider than previously reviewed measures and passed the measure on performance gap with a rating of moderate.

Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity
2a. Reliability: **Total Votes 18; H-1; M-16; L-1; I-0;** 2b. Validity: **Total Votes 18; H-1; M-17; L-0; I-0**

Rationale:

Reliability

- The Standing Committee considered the reliability testing for this measure. The developer reported signal-to-noise reliability scores ranging from 0.27 to 0.92, with a mean and median of 0.60, mean of 0.58, and an interquartile range of 0.45 and 0.71, respectively.
- The developer also calculated an intra-class correlation coefficient (ICC) of 0.436 using a split sample (i.e., test-retest) method.
- The SMP reviewed this measure for reliability and passed the measure with a moderate rating (H-1; M-7; L-1; I-0).
- The Standing Committee agreed that the concerns of low case volume thresholds and the impact on reliability scores were very similar to those previously discussed for measure NQF #0330 and voted to uphold the SMP rating on reliability.

Validity

- The Standing Committee considered the validity testing results, noting that the developer conducted empirical validity testing at the measure score level. The developer examined the relationship between the performance of risk-standardized readmission rate COPD readmission measure scores to that of Hospital Star Rating Readmission group scores, Hospital CABG Surgical Volume, and the Overall Hospital Star Ratings.
- The correlation between CABG RSRRs and: Star-Rating readmissions score is -0.307; Star-Rating summary score is -0.238; and Hospital CABG admission volume among hospitals with more than 25 CABG admissions show mean RSRRs slightly lower among high volume hospitals compared to lower volume hospitals.
- The developer also conducted face validity testing and found 71% of TEP members agreed (somewhat, moderately, or strongly) that the measure will provide an accurate reflection of quality.
- The Standing Committee reviewed the risk adjustment model, which included 26 risk factors, assessing model performance with discrimination and calibration statistics.
- The Standing Committee acknowledged that developer did not adjust for the low AHRQ SES or the dual eligible variables due to the little impact on measure scores. The developer also conducted a decomposition analysis and reports that each of the variables showed a considerably greater hospital-level effect, compared with the patient-level effect and that any patient-level adjustment alone may also adjust for quality differences between hospitals.
- The Standing Committee noted that the SMP passed the measure on validity with a moderate rating (H-1; M-5; L-3; I-0).
- The Standing Committee did not raise any other questions or concerns and voted to uphold the SMP's decision to pass the measure on validity.

Feasibility: Total Votes 18; H-8; M-10; 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 Standing Committee recognized that all data elements for this measure are in defined fields in administrative claims and did not raise any concerns.

Use and Usability

4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)

4a. Use: **Total Votes 18; Pass-18; No Pass-0** *4b. Usability:* **Total Votes 18; H-4; M-14; L-0; I-0**

Rationale:

- The Standing Committee recognized that this measure is currently part of the CMS public reporting program, Hospital Compare, and accountability program HRRP.
- The Standing Committee did not raise any major concerns and passed the measure on Use.
- For Usability, the Standing Committee considered that the median hospital 30-day, all-cause, RSRR for the CABG readmission measure for the three-year period between July 1, 2016 and June 30, 2019 was 12.7%. They stated that the median RSRR decreased by 0.6 absolute percentage points from July 2016-June 2017 (median RSRR: 12.9%) to July 2018-June 2019 (median: RSRR: 12.3%).
- There were no questions or concerns raised by the Standing Committee, and the measure passed the Usability criterion.

Related and Competing Measures

- This measure is related to the following measures:
    - NQF #0114 Risk-Adjusted Postoperative Renal Failure
    - NQF #0115 Risk-Adjusted Surgical Re-Exploration
    - NQF #0119 Risk-Adjusted Operative Mortality for CABG
    - NQF #0129 Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
    - NQF #0130 Risk-Adjusted Deep Sternal Wound Infection
    - NQF #0131 Risk-Adjusted Stroke/Cerebrovascular Accident
    - NQF #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
    - NQF #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization
    - NQF #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - NQF #2558 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
    - NQF #3494 Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
- The developer reported that the measure is harmonized with the above measures to the extent possible given the different data sources used for development and reporting.
- The developer stated that the CABG readmission measure was developed in close collaboration with Society of Thoracic Surgeons (STS). It was developed concurrently with a clinical registry data-based readmission measure (risk-adjusted readmission measure for CABG). The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial Heart Surgery for Atrial Fibrillation (MAZE) procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to differentiate them from open maze procedures. STS measures are specified for age 18 and over, and the CABG readmission measure is currently specified for age 65 and over.
- The developer stated that this measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for CABG). Effort was taken to harmonize both

the registry-based and administrative-based measures to the extent possible given the differences in data sources.

- The STS cardiac surgery registry currently enrolls most, but not all, patients receiving CABG surgeries in the U.S. The proposed CABG readmission measure will capture all qualifying Medicare FFS patients undergoing CABG regardless of whether their hospital or surgeon participates in the STS registry. This claims-based CABG readmission measure was developed with the goal of producing a measure with the highest scientific rigor and broadest applicability.

Standing Committee Recommendation for Endorsement: **Total Votes 18; Y-18**; **N-0**

Public and Member Comment

- Commenters expressed concern with what they identified as less than desirable reliability thresholds and intraclass correlation coefficients at the minimum sample size/case volume.
- Commenters raised concern with the lack of inclusion of social risk factors in the risk adjustment model and questioned the adequacy of the risk model due to the deviance R-squared results. As a result, commenters expressed that they do not believe that several of the measures meet the scientific acceptability criteria.
- Commenters questioned whether the measures remain useful to distinguish hospital performance and drive improvements based on the low number of outliers (best and worst performers) in the distribution of hospital's performance scores and what commenters identified as minimal increases in absolute percentage points between performance periods.

Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

Appeals

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

NQF #	Title	Federal Programs: Finalized or Implemented as of February 1, 2021
0171	Acute Care Hospitalization During the First 60 Days of Home Health	Home Health Compare (Unknown) Home Health Quality Reporting (Active) Home Health Value Based Purchasing (Inactive)
0173	Emergency Department Use Without Hospitalization During the First 60 Days of Home Health	Home Health Compare (Unknown) Home Health Quality Reporting (Active) Home Health Value Based Purchasing (Inactive)
0330	Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart failure (HF) Hospitalization	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Unknown) Hospital Readmission Reduction Program (Active) Medicare and Medicaid Electronic Health Record Incentive Program for Hospitals and Critical Access Hospitals (Unknown)
0505	Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Unknown) Hospital Readmission Reduction Program (Active) Medicare and Medicaid Electronic Health Record Incentive Program for Hospitals and Critical Access Hospitals (Unknown)
0506	Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Unknown) Hospital Readmission Reduction Program (Active) Medicare and Medicaid Electronic Health Record Incentive Program for Hospitals and Critical Access Hospitals (Unknown)
0695	Hospital 30-Day Risk-Standardized Readmission Rates Following Percutaneous	N/A

[a] Per CMS Measures Inventory Tool as of 03/01/2021

NQF #	Title	Federal Programs: Finalized or Implemented as of February 1, 2021
	Coronary Intervention (PCI)	
0727	Gastroenteritis Admission Rate (PDI 16)	N/A
0728	728 Asthma Admission Rate (PDI 14)	N/A
1463	Standardized Hospitalization Ratio for Dialysis Facilities (SHR)	Dialysis Facility Compare (Unknown) End-Stage Renal Disease Quality Incentive Program (Active)
1789	Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) - ACO Level	N/A
1789	Hospital-Wide All-Cause Unplanned Readmission (HWR)	Hospital Inpatient Quality Reporting (Active) Physician Value-Based Payment Modifier (Unknown) Merit-Based Incentive Payment System (MIPS) Program (Inactive)
1891	Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Unknown) Hospital Readmission Reduction Program (Active)
2375	PointRight ® Pro 30™	N/A
2393	Pediatric All-Condition Readmission	N/A
2414	Pediatric Lower Respiratory Infection Readmission	N/A
2503	Hospitalizations per 1000 Medicare Fee-for-	N/A

NQF #	Title	Federal Programs: Finalized or Implemented as of February 1, 2021
	Service (FFS) Beneficiaries	
2504	30-Day Rehospitalizations per 1000 Medicare Fee-for-Service (FFS) Beneficiaries	N/A
2510	Skilled Nursing Facility 30-Day All-Cause Readmission	Skilled Nursing Facility Value Based Purchasing (Active) Medicare Shared Savings Program (Unknown)
2513	Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Vascular Procedures	N/A
2514	Risk-Adjusted Coronary Artery Bypass Graft (CABG) Readmission Rate	N/A
2515	Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Unknown) Hospital Readmission Reduction Program (Active)
2539	Facility 7-Day Risk-Standardized Hospital Visit Rate after Outpatient Colonoscopy	Ambulatory Surgical Center Quality Reporting (Active) Hospital Compare (Unknown) Hospital Outpatient Quality Reporting (Active)
2827	PointRight® Pro Long Stay(TM) Hospitalization	N/A
2858	Discharge to Community	N/A

NQF #	Title	Federal Programs: Finalized or Implemented as of February 1, 2021
2860	30-Day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF)	Hospital Compare (Unknown) Inpatient Psychiatric Facility Quality Reporting (Active)
2879e	Hybrid Hospital-Wide Readmission (HWR) Measure With Claims and Electronic Health Record Data	N/A
2880	Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Active)
2881	Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Active)
2882	Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia	Hospital Compare (Unknown) Hospital Inpatient Quality Reporting (Active)
2888	Risk-Standardized Acute Admission Rates for Patients With Multiple Chronic Conditions	Medicare Shared Savings Program (Active)
3188	30-Day Unplanned Readmissions for Cancer Patients	Prospective Payment System-Exempt Cancer Hospital Quality Reporting (Active)
3366	Hospital Visits After Urology Ambulatory Surgical Center Procedures	Ambulatory Surgical Center Quality Reporting (Active)

NQF #	Title	Federal Programs: Finalized or Implemented as of February 1, 2021
3449	Hospitalization for Ambulatory Care Sensitive Conditions for Dual-Eligible Beneficiaries	N/A
3457	Minimizing Institutional Length of Stay	Medicaid (Active)
3470	Hospital Visits After Orthopedic Ambulatory Surgical Center Procedures	Ambulatory Surgical Center Quality Reporting (Active)
3495	Hospital-Wide 30-Day, All-Cause, Unplanned Readmission Rate (HWR) for the Merit-Based Incentive Payment System (MIPS) Eligible Clinician Groups	N/A
3565	Standardized Emergency Department Encounter Ratio (SEDR) for Dialysis Facilities	N/A
3566	Standardized Ratio of Emergency Department Encounters Occurring Within 30 Days of Hospital Discharge (ED30) for Dialysis Facilities	N/A

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

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Appendix D: Measure Specifications

Measures	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Steward	Centers for Medicare & Medicaid Services
Description	Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).
Type	Outcome
Data Source	Claims, Enrollment Data, Other Medicare administrative claims and enrollment data from calendar years 2017 and 2018, 2013-2017 American Community Survey, and 2017-2018 Area Health Resource File.
Level	Other
Setting	Outpatient Services
Numerator Statement	The outcome for this measure is the number of acute unplanned hospital admissions per 100 person-years at risk for admission during the measurement period.
Numerator Details	Outcome Definition The outcome for this measure is the number of acute, unplanned hospital admissions per 100 person-years at risk for admission during the measurement period. Time Period Number of admissions are counted while the patient is considered at risk for an admission during the measurement year. Excluded Admissions The numerator (outcome) does not include the following admissions because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of MCC patients: 1. Planned hospital admissions; 2. Admissions that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility; 3. Admissions that occur within a 10-day "buffer period" of time after discharge from a hospital, SNF, or acute rehabilitation facility; 4. Admissions that occur after the patient has entered hospice; 5. Admissions related to complications of procedures or surgeries; 6. Admissions related to accidents or injuries; or 7. Admissions that occur prior to the first visit with the assigned clinician or clinician group. 1. Clarification regarding the 10-day "buffer period" The 10-day "buffer period" is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to

Measures	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity. Identification of planned admissions To identify planned admissions, the measure adopted an algorithm previously developed for CMS's hospital readmission measures, CMS's Planned Readmission Algorithm Version 4.0. [1,2] In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip replacement or cholecystectomy). Admissions for an acute illness are never considered planned. For specific codes included in the planned admission algorithm, please see Tables PAA1-PAA4 with the codes for the CMS Planned Admission Algorithm in the accompanying data dictionary. Identification of admissions that occur directly from a SNF or acute rehabilitation facility Claims for SNF and acute rehabilitation facility stays, which help determine the outcome definition, were obtained using CMS's Integrated Data Repository (IDR). Identification of admissions that occur after the patient has entered hospice The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for the measurement year and the year prior were obtained from the CMS Medicare Enrollment Database. Identification of admissions related to complications of procedures or surgeries (including small bowel obstruction), and accidents or injuries Using the Agency for Healthcare Research and Quality's (AHRQ's) Clinical Classifications Software (CCS), which clusters diagnoses into clinically meaningful categories using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, we exclude from the outcome admissions related to the following 23 CCS categories. For specific ICD codes included, please refer to AHRQ's CCS Version 2019.1, Fiscal Year 2020. a) Complications of procedures or surgeries 1. 145: Intestinal obstruction without hernia 2. 237: Complication of device; implant or graft 3. 238: Complications of surgical procedures or medical care 4. 257: Other aftercare b) Accidents or injuries 5. 2601 E Codes: Cut/pierce 6. 2602 E Codes: Drowning/submersion 7. 2604 E Codes: Fire/burn 8. 2605 E Codes: Firearm 9. 2606 E Codes: Machinery 10. 2607 E Codes: Motor vehicle traffic (MVT) 11. 2608 E Codes: Pedal cyclist; not MVT 12. 2609 E Codes: Pedestrian; not MVT 13. 2610 E Codes: Transport; not MVT 14. 2611 E Codes: Natural/environment 15. 2612 E Codes: Overexertion 16. 2613 E Codes: Poisoning 17. 2614 E Codes: Struck by; against

Measures	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	18. 2615 E Codes: Suffocation 19. 2616 E Codes: Adverse effects of medical care 20. 2618 E Codes: Other specified and classifiable 21. 2619 E Codes: Other specified; NEC 22. 2620 E Codes: Unspecified 23. 2621 E Codes: Place of occurrence Citations 1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018. 2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.
Denominator Statement	Patients included in the measure (target patient population) The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs). Attribution: The outcome is attributed to the ACO to which the patient is assigned. (More details are provided in the next section.) Person-time at risk Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.
Denominator Details	Patients included in the measure (target patient population) The cohort, or group of patients included in the measure, is comprised of patients whose combinations of chronic conditions put them at high risk of admission and whose admission rates could be lowered through better care. This definition reflects NQF's "Multiple Chronic Conditions Measurement Framework," which defines patients with MCCs as people "having two or more concurrent chronic conditions that … act together to significantly increase the complexity of management, and affect functional roles and health outcomes, compromise life expectancy, or hinder self-management." [1] The specific inclusion criteria are as follows: 1. Patient is alive at the start of the measurement period and has two or more of nine chronic condition disease groups in the year prior to the measurement period. Chronic conditions, except for diabetes, are defined using CMS's Chronic Conditions Data Warehouse (CCW). For diabetes, we used the diabetes cohort definition from the Accountable Care Organization (ACO) diabetes admission measure developed by CORE (v2018a ACO-36) as opposed to the definition used in CCW, which includes diagnoses for secondary and drug-induced diabetic conditions that are not the focus of the MIPS MCC admission measure. See Table 1 in the accompanying data dictionary for the specific codes used to define the nine cohort-qualifying conditions. 1. Acute myocardial infarction (AMI), 2. Alzheimer's disease and related disorders or senile dementia, 3. Atrial fibrillation, 4. Chronic kidney disease (CKD),

Measures	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	5. Chronic obstructive pulmonary disease (COPD) or asthma, 6. Depression, 7. Diabetes, 8. Heart failure, and 9. Stroke or transient ischemic attack (TIA). Rationale: As noted above, this definition of MCCs is consistent with NQF's "Multiple Chronic Conditions Measurement Framework" and except for diabetes, is the same as the original ACO MCC measure [2]. Diabetes was added as a cohort-qualifying condition based on input from our TEP for the MIPS version of this measure, and further guidance from CMS. The inclusion of diabetes acknowledges the complexity that diabetes introduces to caring for patients with MCCs. 2. Patient is aged =65 years at the start of the year prior to the measurement period. Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult. 3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period. Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment. 4. Patient is attributed to a Medicare Shared Savings Program ACO. Rationale: This measure is designed for ACOs that are part of MSSP and thus includes patients with MCCs who are attributed to one of the MSSP ACOs. The outcome is attributed to the ACO to which the patient is assigned. Patients are assigned to ACOs according to the specific ACO program assignment algorithm. This measure is limited to ACOs that are part of the Medicare Shared Savings Program (MSSP)where patients are retrospectively assigned to an ACO if they obtained the plurality of their primary care through the ACO's providers during the measurement year. Information on ACO beneficiary assignment can be found here: https://www.cms.gov/Medicare/Medicare-Feefor-Service-Payment/sharedsavingsprogram/Downloads/Shared-Savings-Losses-Assignment-Spec-V6.pdf. Citations 1. National Quality Forum. Multiple Chronic Conditions Measurement Framework. http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227. Accessed February 20, 2019. 2. 2. Drye EE, Altaf FK, Lipska KJ et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018; 56(2):193-201.
Exclusions	The measure excludes the following patients: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. 2. Patient enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year. 3. Patients without any visits with any of the TINs associated with the attributed ACO during the measurement year or the year prior to the measurement year. 4. Patients not at risk for hospitalization during the measurement year.

Measures	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Exclusion details	The rationale for each exclusion is provided below: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. Rationale: The measure excludes these patients to ensure full data availability for outcome assessment and attribution. 2. Patients enrolled in hospice during the year prior to the measurement year or at the start of the measurement year. Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, it may be difficult to influence end-of-life care once a patient is enrolled in hospice and served by a hospice team. 3. Patients without any visits (Evaluation & Management [E&M] or other) with any of the TINs associated with the attributed ACO during the measurement year and the year prior to the measurement year. Rationale: These patients are excluded because the start of their time-at-risk cannot be ascertained. 4. Patients not at risk for hospitalization at any time during the measurement year. Rationale: The outcomes for these patients cannot be assessed as they are not at risk. For example, if the first visit to the attributed ACO occurred after the patient has entered hospice, the patient would not have any time at risk and would thus be excluded. See section 2.4.3 of the attached MIPS MCC technical report for methods used to calculate person-time at risk. Clarification of 10-day buffer period: The 10-day "buffer period" is a numerator (or outcome) exclusion (see section S.5) but it also affects the denominator (person-time at risk). Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care. Note that the patient is not removed from the denominator, we are just subtracting the 10-days of person-time. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.
Risk Adjustment	Statistical risk model
Stratification	Not applicable. This measure is not stratified.
Type Score	Rate/proportion better quality = lower score

Measures	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Algorithm	We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation. 112469| 121025| 135961| 141973| 146637| 148806
Copyright / Disclaimer	Not applicable.

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
Steward	Centers for Medicare & Medicaid Services
Description	Risk-Standardized rate of acute, unplanned hospital admissions among Medicare Fee-for-Service (FFS) patients aged 65 years and older with multiple chronic conditions (MCCs).
Type	Outcome
Data Source	Claims, Enrollment Data, Other Medicare administrative claims and enrollment data, American Community Survey, Area Health Resource Files; dates vary; see Section 1.7 of the testing attachment for details.
Level	Clinician : Group/Practice
Setting	Outpatient Services
Numerator Statement	The outcome for this measure is the number of acute admissions per 100 person-years at risk for admission during the measurement period.
Numerator Details	Outcome Definition

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	The outcome for this measure is the number of acute, unplanned hospital admissions per 100 person-years at risk for admission during the measurement period. Time Period Number of admissions are counted while the patient is considered at risk for an admission during the measurement year. Excluded Admissions The numerator (outcome) does not include the following admissions because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of MCC patients: 1. Planned hospital admissions; 2. Admissions that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility; 3. Admissions that occur within a 10-day "buffer period" of time after discharge from a hospital, SNF, or acute rehabilitation facility; 4. Admissions that occur after the patient has entered hospice; 5. Admissions related to complications of procedures or surgeries; 6. Admissions related to accidents or injuries; or 7. Admissions that occur prior to the first visit with the assigned clinician or clinician group. Clarification regarding the 10-day "buffer period" The 10-day "buffer period" is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity. Identification of Planned Admissions To identify planned admissions, the measure adopted an algorithm previously developed for CMS's hospital readmission measures, CMS's Planned Readmission Algorithm Version 4.0. [1,2] In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip replacement or cholecystectomy). Admissions for an acute illness are never considered planned. For specific codes included in the planned admission algorithm please see Tables PAA1-PAA4 with the codes for the CMS Planned Admission Algorithm in the accompanying data dictionary. Identification of admissions that occur directly from an SNF or acute rehabilitation facility Claims for SNF and acute rehabilitation facility stays, which help determine the outcome definition, were obtained using CMS's Integrated Data Repository (IDR) and Medicare Provider Analysis and Review (MedPAR) files, respectively. Identification of admissions that occur after the patient has entered hospice

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for the measurement year and the year prior were obtained from the CMS Medicare Enrollment Database. Identification of admissions related to complications of procedures or surgeries (including small bowel obstruction), and accidents or injuries Using the Agency for Healthcare Research and Quality's (AHRQ's) Clinical Classifications Software (CCS), which clusters diagnoses into clinically meaningful categories using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, we exclude from the outcome admissions related to the following 23 CCS categories. For specific ICD codes included, please refer to AHRQ's CCS Version 2019.1, Fiscal Year 2020. a) Complications of procedures or surgeries 1. 145: Intestinal obstruction without hernia 2. 237: Complication of device; implant or graft 3. 238: Complications of surgical procedures or medical care 4. 257: Other aftercare b) Accidents or injuries 5. 2601 E Codes: Cut/pierce 6. 2602 E Codes: Drowning/submersion 7. 2604 E Codes: Fire/burn 8. 2605 E Codes: Firearm 9. 2606 E Codes: Machinery 10. 2607 E Codes: Motor vehicle traffic (MVT) 11. 2608 E Codes: Pedal cyclist; not MVT 12. 2609 E Codes: Pedestrian; not MVT 13. 2610 E Codes: Transport; not MVT 14. 2611 E Codes: Natural/environment 15. 2612 E Codes: Overexertion 16. 2613 E Codes: Poisoning 17. 2614 E Codes: Struck by; against 18. 2615 E Codes: Suffocation 19. 2616 E Codes: Adverse effects of medical care 20. 2618 E Codes: Other specified and classifiable 21. 2619 E Codes: Other specified; NEC 22. 2620 E Codes: Unspecified 23. 2621 E Codes: Place of occurrence Citations 1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018. 2. 2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.
Denominator Statement	Patients included in the measure (target patient population)

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs). Provider types included for measurement 1. Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine, and non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants. 2. Relevant specialists: Specialists covered by the measure are limited to those who provide overall coordination of care for patients with MCCs and who manage the chronic diseases that put the MCCs patients in the measure at risk of admission. These specialists were chosen with input from our Technical Expert Panel (TEP) and include cardiologists, pulmonologists, nephrologists, neurologists, endocrinologists, and hematologists/oncologists. However, as indicated below and in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure. Patient attribution We begin by assigning each patient to the clinician most responsible for the patient's care. The patient can be assigned to a PCP, a relevant specialist, or can be left unassigned. 3. A patient who is eligible for attribution can be assigned to a relevant specialist only if the specialist has been identified as "dominant". A specialist is considered "dominant" if they have two or more visits with the patient, as well as at least two more visits than any PCP or other relevant specialist. For example, if a patient saw a cardiologist four times in the measurement year, a PCP twice, and a nephrologist twice, the patient would be assigned to the cardiologist, having met the definition of "dominant" specialist. Note: Hematologists and oncologists are considered relevant specialists as they could be expected to manage MCCs patients' care, especially during periods of acute cancer treatment. However, as indicated below in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure. 4. There are two scenarios where a patient can be assigned to a PCP. First, the patient must have seen at least one PCP. The patient will then be assigned to the PCP with the highest number of visits as long as there is no relevant specialist who is considered "dominant." Second, if the patient has had more than one visit with a relevant specialist but no "dominant" specialist has been identified, and has two or more visits with a PCP, they will be assigned to that PCP. 5. Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no "dominant" specialist can be identified, or if the patient has not had more than one visit with any individual PCP. Patients are then assigned at the Taxpayer Identification Number (TIN) level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN. 6. At the TIN level, patients are first assigned to the clinician (unique National Provider Identifier (NPI)/TIN combination since a given provider can be affiliated with more than one TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above) and then patients "follow" their clinician to the TIN designated by the clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level.

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	(Note that an alternative attribution approach was considered and assessed as described in section 2b.3.11 of the testing attachment and in Appendix C of the attached methodology report.) Person-time at risk Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.
Denominator Details	Patients included in the measure (target patient population) The cohort, or group of patients included in the measure, is comprised of patients whose combinations of chronic conditions put them at high risk of admission and whose admission rates could be lowered through better care. This definition reflects NQF's "Multiple Chronic Conditions Measurement Framework," which defines patients with MCCs as people "having two or more concurrent chronic conditions that … act together to significantly increase the complexity of management, and affect functional roles and health outcomes, compromise life expectancy, or hinder self-management." [1] The specific inclusion criteria are as follows. 1. Patient is alive at the start of the measurement period and has two or more of nine chronic condition disease groups in the year prior to the measurement period. Chronic conditions, except for diabetes, are defined using CMS's Chronic Conditions Data Warehouse (CCW). For diabetes, we used the diabetes cohort definition from the Accountable Care Organization (ACO) diabetes admission measure developed by CORE (v2018a ACO-36) as opposed to the definition used in CCW, which includes diagnoses for secondary and drug-induced diabetic conditions that are not the focus of the MIPS MCCs admission measure. See Table 1 in the accompanying data dictionary for the specific codes used to define the nine cohort-qualifying conditions. 1. Acute myocardial infarction (AMI), 2. Alzheimer's disease and related disorders or senile dementia, 3. Atrial fibrillation, 4. Chronic kidney disease (CKD), 5. Chronic obstructive pulmonary disease (COPD) or asthma, 6. Depression, 7. Diabetes, 8. Heart failure, and 9. Stroke or transient ischemic attack (TIA). Rationale: As noted above, this definition of MCCs is consistent with NQF's "Multiple Chronic Conditions Measurement Framework." The specific list of chronic conditions, except for diabetes, is the same as is used in the MCCs admission measure for ACOs (ACO-38) currently implemented the Medicare Shared Savings Program. This measure has been vetted nationally and published in the literature. [2] In brief, it reflects the chronic conditions that most increased risk of admission. In adapting the ACO measure for the MIPS setting, we added diabetes as a cohort-qualifying condition based on input from our TEP and further guidance from CMS. In addition, the inclusion of diabetes acknowledges the complexity that diabetes introduces to caring for patients with MCCs. 2. Patient is aged =65 years at the start of the year prior to the measurement period.

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult. 3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period. Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment. Provider types included for measurement Because we use the outcome of acute, unplanned admissions to assess quality, we limit the clinicians covered by the measure to two categories of providers for whom this outcome reflects care quality. This includes primary care providers (PCPs) and a subset of specialists who manage the care of MCCs patients. Primary Care Providers - CMS designates PCPs as physicians who practice: 1. Internal medicine, 2. Family medicine, 3. General medicine, or 4. Geriatric medicine; and The following non-physician clinicians: 1. Nurse practitioners, 2. Certified clinical nurse specialists, and 3. Physician assistants. [3] Relevant specialists - Based on input from the TEP, specialists covered by the measure are limited to those who plausibly provide overall coordination of care for patients with MCCs and who manage the chronic diseases that put the MCCs patients in the measure at risk of admission. These “relevant” specialists, defined using the Medicare Provider Specialty Codes (see Table 4 in the accompanying data dictionary), are: 1. Cardiologists, 2. Pulmonologists, 3. Nephrologists, 4. Neurologists, 5. Endocrinologists, and 6. Hematologists/oncologists. Note: Hematologists and oncologists are considered relevant specialists as they could be expected to manage MCCs patients’ care, especially during periods of acute cancer treatment. However, as indicated below in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure. Patient attribution As noted in field Section S.6., we use a visit-based algorithm to assign MCCs patients to the individual clinician most responsible for their care. The attribution approach uses the plurality of Evaluation and Management (E&M) visits. (Please see Table 3 in the accompanying data dictionary for specific codes.) Focusing on visits over charges when assigning responsibility acknowledges the importance of provider interaction with the patient in establishing accountability for outcomes. In most instances, the provider with the most visits is a PCP. Citations

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	1. National Quality Forum. Multiple Chronic Conditions Measurement Framework. http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227. Accessed February 20, 2019. 2. Drye EE, Altaf FK, Lipska KJ, et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018;56(2):193-201. 3. Centers for Medicare & Medicaid Services. Medicare Claims Processing Manual Chapter 4 - Part B Hospital (Including Inpatient Hospital Part B and OPPS) (section 250.12.1). https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/clm104c04.pdf. Accessed February 20, 2019.
Exclusions	We exclude patients from the cohort for these reasons: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. 2. Patients enrolled in hospice at any time during the year prior to the measurement year or at start of the measurement year. 3. Patients with no E&M visit to a MIPS eligible clinician. 4. Patients assigned to clinicians who do not participate in the QPP on the MIPS track. 5. Patients attributed to hematologists and oncologists. 6. Patients not at risk for hospitalization during the measurement year.
Exclusion details	The rationale for each exclusion is provided below: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. Rationale: The measure excludes these patients to ensure full data availability for outcome assessment and attribution. 2. Patients enrolled in hospice at any time during the year prior to the measurement year or at start of the measurement year. Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, ambulatory care providers may have relatively little influence on end-of-life care once a patient is enrolled in hospice and served by a hospice team. 3. Patients with no E&M visit to a MIPS eligible clinician. Rationale: The measure excludes these patients because they could not be attributed to a provider using the visit-based attribution algorithm (see Section S.6 for details). 4. Patients assigned to clinicians who do not participate in the QPP on the MIPS track. Rationale: These patients are excluded because the clinicians to whom they are assigned do not participate in MIPS. 5. Patients attributed to hematologists and oncologists. Rationale: The outcomes for patients who are predominantly cared for by hematologists and oncologists, including patients actively being managed for cancer, are unlikely to reflect the quality of care provided by primary care provider (PCP) or other relevant specialists. The aim of this measure is not to assess the quality of care during such instances of active cancer treatment. Excluding patients assigned to hematologists and oncologists takes out of the measure patients who are being actively treated for cancer during the measurement period but retains in the measure patients with MCCs who have a history of cancer or are occasionally being seen by a cancer specialist for follow-up. 6. Patients not at risk for hospitalization during the measurement year. Rationale: The outcomes for these patients cannot be assessed as they are not at risk. For example, if the first attributed visit occurred after the patient has entered hospice, the

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	patient would not have any time at risk and would thus be excluded. See section 2.4.3 of the attached methodology report for methods used to calculate person-time at risk. Clarification of 10-day buffer period: The 10-day "buffer period" is a numerator (or outcome) exclusion (see section S.5) but it also affects the denominator (person-time at risk). Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care. Note that the patient is not removed from the denominator, we are just subtracting the 10-days of person-time. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.
Risk Adjustment	Statistical risk model
Stratification	N/A; this measure is not stratified.
Type Score	Rate/proportion better quality = lower score
Algorithm	We begin by identifying the cohort of patients with MCCs by applying the inclusion/exclusion criteria. We then use the attribution algorithm to assign patients to TINs. Patients are assigned to the individual clinician most responsible for their care, and then subsequently to the TIN designated by the clinician, using our visit-based attribution algorithm. Attribution is done in the measurement period and only patients assigned to a MIPS-eligible clinician will be included in the measure score calculation. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within MIPS providers and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCCs patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to MIPS-eligible clinicians. Therefore, the "expected" number of admissions (described below) for each provider is based on the performance of all eligible MIPS providers nationwide. The second level of the model estimates a random-intercept term that reflects the provider's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of

Measures	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	admissions is calculated based on the provider's case mix and average intercept among all MIPS providers. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MIPS providers – for ease of interpretation. 121025| 146313| 146637
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Measures	0330 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization
Steward	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.
Type	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, and inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

Measures	0330 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization
	References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.
Level	Facility
Setting	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. 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. Additional details are provided in S.5 Numerator Details.
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 HF 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 using Medicare claims and VA administrative 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/radiotherapy/ 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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).
Denominator Statement	The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details

Measures	0330 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria: 1. Principal discharge diagnosis of HF; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 1. 5. Not transferred to another acute care facility.
Exclusions	The 30-day HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Admitted within 30 days of a prior index admission for HF; and 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.
Exclusion details	The HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be found in attached Data Dictionary). Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.
Risk Adjustment	Statistical risk model
Stratification	N/A
Type Score	Rate/proportion better quality = lower score

Measures	0330 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization
Algorithm	The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF 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 and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. 117446| 141973| 137977| 112469| 146637| 150289
Copyright / Disclaimer	N/A

Measures	0505 Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.
Steward	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.
Type	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains administrative data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.
Level	Facility
Setting	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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. Additional details are provided in S.5 Numerator Details.

Measures	0505 Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.
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 AMI 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 using Medicare and VA 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).
Denominator Statement	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.7 Denominator Details.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of AMI; 2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.
Exclusions	The 30-day AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Same-day discharges; or 4. 4) Admitted within 30 days of a prior index admission for AMI.

Measures	0505 Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.
Exclusion details	The AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Same-day discharges. This information is identified in claims data. Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs. 4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.
Risk Adjustment	Statistical risk model
Stratification	N/A
Type Score	Rate/proportion better quality = lower score

Measures	0505 Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology) References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 118210| 112469| 146637
Copyright / Disclaimer	N/A

Measures	0506 Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
Steward	Centers for Medicare & Medicaid Services

Measures	0506 Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.
Type	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.
Level	Facility
Setting	Inpatient/Hospital

Measures	0506 Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.
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 pneumonia 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 using Medicare claims and VA administrative 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the pneumonia measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).
Denominator Statement	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.

Measures	0506 Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. 5. Not transferred from another acute care facility.
Exclusions	The 30-day pneumonia (PN) readmission measure excludes index admissions for patients: 1. Discharged against medical advice (AMA); 2. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 3. 3. Admitted within 30 days of a prior index admission for pneumonia.
Exclusion details	The pneumonia readmission measure excludes index admissions for patients: 1. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Pneumonia admissions within 30 days of discharge from a qualifying pneumonia index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.
Risk Adjustment	Statistical risk model
Stratification	N/A
Type Score	Rate/proportion better quality = lower score

Measures	0506 Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 141973| 112469| 146637
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Measures	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Steward	Centers for Medicare & Medicaid Services

Measures	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) 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 and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.
Type	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual-eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.
Level	Facility
Setting	Inpatient/Hospital

Measures	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Numerator Statement	The outcome for this 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 the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.
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 COPD 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 using Medicare and VA 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the COPD measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).
Denominator Statement	The cohort includes admissions for patients aged 65 or older, who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.9 Denominator Details.

Measures	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of COPD with exacerbation; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.
Exclusions	The 30-day COPD readmission measures exclude index admissions for patients: 1. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); and, 3. Admitted within 30 days of a prior index admission for COPD.
Exclusion details	1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. COPD admissions within 30 days of discharge from a qualifying COPD index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.
Risk Adjustment	Statistical risk model
Stratification	N/A
Type Score	Rate/proportion better quality = lower score

Measures	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 118210| 135810| 141973| 146637| 141015
Copyright / Disclaimer	N/A

Measures	2515 Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery
Steward	Centers for Medicare & Medicaid Services

Measures	2515 Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older. An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.
Type	Outcome
Data Source	Claims, Enrollment Data Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.
Level	Facility
Setting	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.
Numerator Details	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge after undergoing isolated CABG surgery, excluding planned readmissions as defined below. Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure. Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

Measures	2515 Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery
	In brief, the algorithm identifies a short list of always planned readmissions (those where the principal discharge diagnosis is major organ transplant, obstetrical delivery, or maintenance chemotherapy) as well as those readmissions with a potentially planned procedure (e.g., total hip replacement) AND a non-acute principle discharge diagnosis code. For example, a readmission for colon resection is considered planned if the principal diagnosis is colon cancer but unplanned if the principal diagnosis is abdominal pain, as this might represent a complication of the CABG procedure or hospitalization. Readmissions that included potentially planned procedures with an acute principal diagnosis or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are not excluded from the measure outcome as they are considered unplanned in this measure. The planned readmission algorithm has three fundamental principles: 1. A few specific, limited types of care are always considered planned (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the CABG measure with modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table). It should be noted that this approach differs from that adopted by STS for their registry-based measure, in which all 30-day readmissions were considered to be unplanned. Outcome Attribution Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows: 4. If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the readmission outcome is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates readmission risk even among transferred patients. 5. If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the readmission outcome is attributed to the second hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: Care provided by the hospital performing the CABG procedure likely dominates readmission risk. 6. If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the readmission outcome is attributed to the first hospital performing the index (first) CABG procedure

Measures	2515 Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery
	and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates readmission risk even among transferred patients.
Denominator Statement	The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.
Denominator Details	In order to create a clinically coherent population for risk adjustment, and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures).
Exclusions	For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions: 1. Without at least 30 days post-discharge enrollment in FFS Medicare 2. Discharged against medical advice (AMA) 3. Admissions for subsequent qualifying CABG procedures during the measurement period
Exclusion details	The CABG readmission measure excludes hospitalizations if they meet any of the following criteria: 1. Without at least 30 days post-discharge enrollment in FFS Medicare Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Admissions for subsequent qualifying CABG procedures during the measurement period. Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.
Risk Adjustment	Statistical risk model
Stratification	N/A
Type Score	Rate/proportion better quality = lower score

Measures	2515 Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery
Algorithm	The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet: (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 118210| 112469| 135466| 146637| 141015
Copyright / Disclaimer	N/A

Appendix E: Related and Competing Measures

Comparison of NQF #2888 and NQF #3597

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).	Risk-Standardized rate of acute, unplanned hospital admissions among Medicare Fee-for-Service (FFS) patients aged 65 years and older with multiple chronic conditions (MCCs).
Type	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Medicare administrative claims and enrollment data from calendar years 2017 and 2018, 2013-2017 American Community Survey, and 2017-2018 Area Health Resource File. No data collection instrument provided Attachment NQF_ACO_MCC_DataDictionary_07.09.20.xlsx	Claims, Enrollment Data, Other Medicare administrative claims and enrollment data, American Community Survey, Area Health Resource Files; dates vary; see Section 1.7 of the testing attachment for details. No data collection instrument provided Attachment NQF_MIPS_MCC_DataDictionary_07302020-637402642885077993.xlsx
Level	Other	Clinician : Group/Practice
Setting	Outpatient Services	Outpatient Services
Numerator Statement	The outcome for this measure is the number of acute unplanned hospital admissions per 100 person-years at risk for admission during the measurement period.	The outcome for this measure is the number of acute admissions per 100 person-years at risk for admission during the measurement period.
Numerator Details	Outcome Definition The outcome for this measure is the number of acute, unplanned hospital admissions per 100 person-years at risk for admission during the measurement period. Time Period Number of admissions are counted while the patient is considered at risk for an admission during the measurement year. Excluded Admissions The numerator (outcome) does not include the following admissions because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of MCC patients: 1. Planned hospital admissions;	Outcome Definition The outcome for this measure is the number of acute, unplanned hospital admissions per 100 person-years at risk for admission during the measurement period. Time Period Number of admissions are counted while the patient is considered at risk for an admission during the measurement year. Excluded Admissions The numerator (outcome) does not include the following admissions because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of MCC patients: 1. Planned hospital admissions;

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	2. Admissions that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility; 3. Admissions that occur within a 10-day "buffer period" of time after discharge from a hospital, SNF, or acute rehabilitation facility; 4. Admissions that occur after the patient has entered hospice; 5. Admissions related to complications of procedures or surgeries; 6. Admissions related to accidents or injuries; or 7. Admissions that occur prior to the first visit with the assigned clinician or clinician group. Clarification regarding the 10-day "buffer period" The 10-day "buffer period" is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity. Identification of planned admissions To identify planned admissions, the measure adopted an algorithm previously developed for CMS's hospital readmission measures, CMS's Planned Readmission Algorithm Version 4.0. [1,2] In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip replacement or cholecystectomy). Admissions for an acute illness are never considered planned. For specific codes included in the	2. Admissions that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility; 3. Admissions that occur within a 10-day "buffer period" of time after discharge from a hospital, SNF, or acute rehabilitation facility; 4. Admissions that occur after the patient has entered hospice; 5. Admissions related to complications of procedures or surgeries; 6. Admissions related to accidents or injuries; or 7. Admissions that occur prior to the first visit with the assigned clinician or clinician group. Clarification regarding the 10-day "buffer period" The 10-day "buffer period" is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity. Identification of Planned Admissions To identify planned admissions, the measure adopted an algorithm previously developed for CMS's hospital readmission measures, CMS's Planned Readmission Algorithm Version 4.0. [1,2] In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip replacement or cholecystectomy). Admissions for an acute illness are never considered

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	planned admission algorithm, please see Tables PAA1-PAA4 with the codes for the CMS Planned Admission Algorithm in the accompanying data dictionary. Identification of admissions that occur directly from a SNF or acute rehabilitation facility Claims for SNF and acute rehabilitation facility stays, which help determine the outcome definition, were obtained using CMS's Integrated Data Repository (IDR). Identification of admissions that occur after the patient has entered hospice The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for the measurement year and the year prior were obtained from the CMS Medicare Enrollment Database. Identification of admissions related to complications of procedures or surgeries (including small bowel obstruction), and accidents or injuries Using the Agency for Healthcare Research and Quality's (AHRQ's) Clinical Classifications Software (CCS), which clusters diagnoses into clinically meaningful categories using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, we exclude from the outcome admissions related to the following 23 CCS categories. For specific ICD codes included, please refer to AHRQ's CCS Version 2019.1, Fiscal Year 2020. a. Complications of procedures or surgeries 1. 145: Intestinal obstruction without hernia 2. 237: Complication of device; implant or graft 3. 238: Complications of surgical procedures or medical care 4. 257: Other aftercare b. Accidents or injuries 1. 2601 E Codes: Cut/pierce 2. 2602 E Codes: Drowning/submersion 3. 2604 E Codes: Fire/burn 4. 2605 E Codes: Firearm 5. 2606 E Codes: Machinery 6. 2607 E Codes: Motor vehicle traffic (MVT) 7. 2608 E Codes: Pedal cyclist; not MVT	planned. For specific codes included in the planned admission algorithm please see Tables PAA1-PAA4 with the codes for the CMS Planned Admission Algorithm in the accompanying data dictionary. Identification of admissions that occur directly from an SNF or acute rehabilitation facility Claims for SNF and acute rehabilitation facility stays, which help determine the outcome definition, were obtained using CMS's Integrated Data Repository (IDR) and Medicare Provider Analysis and Review (MedPAR) files, respectively. Identification of admissions that occur after the patient has entered hospice The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for the measurement year and the year prior were obtained from the CMS Medicare Enrollment Database. Identification of admissions related to complications of procedures or surgeries (including small bowel obstruction), and accidents or injuries Using the Agency for Healthcare Research and Quality's (AHRQ's) Clinical Classifications Software (CCS), which clusters diagnoses into clinically meaningful categories using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, we exclude from the outcome admissions related to the following 23 CCS categories. For specific ICD codes included, please refer to AHRQ's CCS Version 2019.1, Fiscal Year 2020. a. Complications of procedures or surgeries 1. 145: Intestinal obstruction without hernia 2. 237: Complication of device; implant or graft 3. 238: Complications of surgical procedures or medical care 4. 257: Other aftercare b. Accidents or injuries 1. 2601 E Codes: Cut/pierce 2. 2602 E Codes: Drowning/submersion 3. 2604 E Codes: Fire/burn 4. 2605 E Codes: Firearm 5. 2606 E Codes: Machinery

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	8. 2609 E Codes: Pedestrian; not MVT 9. 2610 E Codes: Transport; not MVT 10. 2611 E Codes: Natural/environment 11. 2612 E Codes: Overexertion 12. 2613 E Codes: Poisoning 13. 2614 E Codes: Struck by; against 14. 2615 E Codes: Suffocation 15. 2616 E Codes: Adverse effects of medical care 16. 2618 E Codes: Other specified and classifiable 17. 2619 E Codes: Other specified; NEC 18. 2620 E Codes: Unspecified 19. 2621 E Codes: Place of occurrence Citations 1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018. 2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.	6. 2607 E Codes: Motor vehicle traffic (MVT) 7. 2608 E Codes: Pedal cyclist; not MVT 8. 2609 E Codes: Pedestrian; not MVT 9. 2610 E Codes: Transport; not MVT 10. 2611 E Codes: Natural/environment 11. 2612 E Codes: Overexertion 12. 2613 E Codes: Poisoning 13. 2614 E Codes: Struck by; against 14. 2615 E Codes: Suffocation 15. 2616 E Codes: Adverse effects of medical care 16. 2618 E Codes: Other specified and classifiable 17. 2619 E Codes: Other specified; NEC 18. 2620 E Codes: Unspecified 19. 2621 E Codes: Place of occurrence Citations 1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018. 2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.
Denominator Statement	Patients included in the measure (target patient population) The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs). Attribution: The outcome is attributed to the ACO to which the patient is assigned. (More details are provided in the next section.) Person-time at risk Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In	Patients included in the measure (target patient population) The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs). Provider types included for measurement 1. Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine, and non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.	2. Relevant specialists: Specialists covered by the measure are limited to those who provide overall coordination of care for patients with MCCs and who manage the chronic diseases that put the MCCs patients in the measure at risk of admission. These specialists were chosen with input from our Technical Expert Panel (TEP) and include cardiologists, pulmonologists, nephrologists, neurologists, endocrinologists, and hematologists/oncologists. However, as indicated below and in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure. Patient attribution We begin by assigning each patient to the clinician most responsible for the patient's care. The patient can be assigned to a PCP, a relevant specialist, or can be left unassigned. 3. A patient who is eligible for attribution can be assigned to a relevant specialist only if the specialist has been identified as "dominant". A specialist is considered "dominant" if they have two or more visits with the patient, as well as at least two more visits than any PCP or other relevant specialist. For example, if a patient saw a cardiologist four times in the measurement year, a PCP twice, and a nephrologist twice, the patient would be assigned to the cardiologist, having met the definition of "dominant" specialist. Note: Hematologists and oncologists are considered relevant specialists as they could be expected to manage MCCs patients' care, especially during periods of acute cancer treatment. However, as indicated below in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure. 4. There are two scenarios where a patient can be assigned to a PCP. First, the patient must have seen at least one PCP. The patient will then be assigned to the PCP with the highest number of visits as long as there is no relevant specialist who is considered "dominant." Second, if the patient has had more than one visit with a relevant specialist but no

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
		"dominant" specialist has been identified, and has two or more visits with a PCP, they will be assigned to that PCP. 5. Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no "dominant" specialist can be identified, or if the patient has not had more than one visit with any individual PCP. Patients are then assigned at the Taxpayer Identification Number (TIN) level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN. 6. At the TIN level, patients are first assigned to the clinician (unique National Provider Identifier (NPI)/TIN combination since a given provider can be affiliated with more than one TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above) and then patients "follow" their clinician to the TIN designated by the clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level. (Note that an alternative attribution approach was considered and assessed as described in section 2b.3.11 of the testing attachment and in Appendix C of the attached methodology report.) Person-time at risk Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.
Denominator Details	Patients included in the measure (target patient population) The cohort, or group of patients included in the measure, is comprised of patients whose combinations of chronic conditions put them at high risk of admission and whose admission rates could be lowered through better care. This definition reflects NQF's "Multiple Chronic Conditions Measurement Framework," which defines patients with MCCs as people "having two or more concurrent chronic conditions that … act together to significantly increase the	Patients included in the measure (target patient population) The cohort, or group of patients included in the measure, is comprised of patients whose combinations of chronic conditions put them at high risk of admission and whose admission rates could be lowered through better care. This definition reflects NQF's "Multiple Chronic Conditions Measurement Framework," which defines patients with MCCs as people "having two or more concurrent chronic conditions that … act together to significantly increase the complexity of management, and affect functional roles and

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	complexity of management, and affect functional roles and health outcomes, compromise life expectancy, or hinder self-management." [1] The specific inclusion criteria are as follows: 1. Patient is alive at the start of the measurement period and has two or more of nine chronic condition disease groups in the year prior to the measurement period. Chronic conditions, except for diabetes, are defined using CMS's Chronic Conditions Data Warehouse (CCW). For diabetes, we used the diabetes cohort definition from the Accountable Care Organization (ACO) diabetes admission measure developed by CORE (v2018a ACO-36) as opposed to the definition used in CCW, which includes diagnoses for secondary and drug-induced diabetic conditions that are not the focus of the MIPS MCC admission measure. See Table 1 in the accompanying data dictionary for the specific codes used to define the nine cohort-qualifying conditions. 1. Acute myocardial infarction (AMI), 2. Alzheimer's disease and related disorders or senile dementia, 3. Atrial fibrillation, 4. Chronic kidney disease (CKD), 5. Chronic obstructive pulmonary disease (COPD) or asthma, 6. Depression, 7. Diabetes, 8. Heart failure, and 9. Stroke or transient ischemic attack (TIA). Rationale: As noted above, this definition of MCCs is consistent with NQF's "Multiple Chronic Conditions Measurement Framework" and except for diabetes, is the same as the original ACO MCC measure [2]. Diabetes was added as a cohort-qualifying condition based on input from our TEP for the MIPS version of this measure, and further guidance from CMS. The inclusion of diabetes acknowledges the complexity that diabetes introduces to caring for patients with MCCs. 2. Patient is aged =65 years at the start of the year prior to the measurement period.	health outcomes, compromise life expectancy, or hinder self-management." [1] The specific inclusion criteria are as follows. 1. Patient is alive at the start of the measurement period and has two or more of nine chronic condition disease groups in the year prior to the measurement period. Chronic conditions, except for diabetes, are defined using CMS's Chronic Conditions Data Warehouse (CCW). For diabetes, we used the diabetes cohort definition from the Accountable Care Organization (ACO) diabetes admission measure developed by CORE (v2018a ACO-36) as opposed to the definition used in CCW, which includes diagnoses for secondary and drug-induced diabetic conditions that are not the focus of the MIPS MCCs admission measure. See Table 1 in the accompanying data dictionary for the specific codes used to define the nine cohort-qualifying conditions. 1. Acute myocardial infarction (AMI), 2. Alzheimer's disease and related disorders or senile dementia, 3. Atrial fibrillation, 4. Chronic kidney disease (CKD), 5. Chronic obstructive pulmonary disease (COPD) or asthma, 6. Depression, 7. Diabetes, 8. Heart failure, and 9. Stroke or transient ischemic attack (TIA). Rationale: As noted above, this definition of MCCs is consistent with NQF's "Multiple Chronic Conditions Measurement Framework." The specific list of chronic conditions, except for diabetes, is the same as is used in the MCCs admission measure for ACOs (ACO-38) currently implemented the Medicare Shared Savings Program. This measure has been vetted nationally and published in the literature. [2] In brief, it reflects the chronic conditions that most increased risk of admission. In adapting the ACO measure for the MIPS setting, we added diabetes as a cohort-qualifying condition based on input from our TEP and further guidance from CMS. In addition, the inclusion of diabetes acknowledges the complexity that diabetes introduces to caring for patients with MCCs.

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult. 3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period. Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment. 4. Patient is attributed to a Medicare Shared Savings Program ACO. Rationale: This measure is designed for ACOs that are part of MSSP and thus includes patients with MCCs who are attributed to one of the MSSP ACOs. The outcome is attributed to the ACO to which the patient is assigned. Patients are assigned to ACOs according to the specific ACO program assignment algorithm. This measure is limited to ACOs that are part of the Medicare Shared Savings Program (MSSP)where patients are retrospectively assigned to an ACO if they obtained the plurality of their primary care through the ACO's providers during the measurement year. Information on ACO beneficiary assignment can be found here: https://www.cms.gov/Medicare/Medicare-Feefor-Service-Payment/sharedsavingsprogram/Downloads/Shared-Savings-Losses-Assignment-Spec-V6.pdf. Citations 1. National Quality Forum. Multiple Chronic Conditions Measurement Framework. http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227. Accessed February 20, 2019. 2. Drye EE, Altaf FK, Lipska KJ et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018; 56(2):193-201.	2. Patient is aged =65 years at the start of the year prior to the measurement period. Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult. 3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period. Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment. Provider types included for measurement Because we use the outcome of acute, unplanned admissions to assess quality, we limit the clinicians covered by the measure to two categories of providers for whom this outcome reflects care quality. This includes primary care providers (PCPs) and a subset of specialists who manage the care of MCCs patients. Primary Care Providers - CMS designates PCPs as physicians who practice: 1. Internal medicine, 2. Family medicine, 3. General medicine, or 4. Geriatric medicine; and The following non-physician clinicians: 1. Nurse practitioners, 2. Certified clinical nurse specialists, and 3. Physician assistants. [3] Relevant specialists - Based on input from the TEP, specialists covered by the measure are limited to those who plausibly provide overall coordination of care for patients with MCCs and who manage the chronic diseases that put the MCCs patients in the measure at risk of admission. These "relevant" specialists, defined using the Medicare Provider Specialty Codes (see Table 4 in the accompanying data dictionary), are:

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
		1. Cardiologists, 2. Pulmonologists, 3. Nephrologists, 4. Neurologists, 5. Endocrinologists, and 6. Hematologists/oncologists. Note: Hematologists and oncologists are considered relevant specialists as they could be expected to manage MCCs patients' care, especially during periods of acute cancer treatment. However, as indicated below in Section S.9, the measure is not designed to assess the quality of care of cancer specialists who are actively managing cancer patients, and thus patients attributed to hematologists and oncologists are excluded from the measure. Patient attribution As noted in field Section S.6., we use a visit-based algorithm to assign MCCs patients to the individual clinician most responsible for their care. The attribution approach uses the plurality of Evaluation and Management (E&M) visits. (Please see Table 3 in the accompanying data dictionary for specific codes.) Focusing on visits over charges when assigning responsibility acknowledges the importance of provider interaction with the patient in establishing accountability for outcomes. In most instances, the provider with the most visits is a PCP. Citations 1. National Quality Forum. Multiple Chronic Conditions Measurement Framework. 2. Drye EE, Altaf FK, Lipska KJ, et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018;56(2):193-201. 3. Centers for Medicare & Medicaid Services. Medicare Claims Processing Manual Chapter 4 - Part B Hospital (Including Inpatient Hospital Part B and OPPS) (section 250.12.1). https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/clm104c04.pdf. Accessed February 20, 2019.
Exclusions	The measure excludes the following patients:	We exclude patients from the cohort for these reasons:

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. 2. Patient enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year. 3. Patients without any visits with any of the TINs associated with the attributed ACO during the measurement year or the year prior to the measurement year. 4. Patients not at risk for hospitalization during the measurement year.	1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. 2. Patients enrolled in hospice at any time during the year prior to the measurement year or at start of the measurement year. 3. Patients with no E&M visit to a MIPS eligible clinician. 4. Patients assigned to clinicians who do not participate in the QPP on the MIPS track. 5. Patients attributed to hematologists and oncologists. 6. Patients not at risk for hospitalization during the measurement year.
Exclusion Details	The rationale for each exclusion is provided below: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. Rationale: The measure excludes these patients to ensure full data availability for outcome assessment and attribution. 2. Patients enrolled in hospice during the year prior to the measurement year or at the start of the measurement year. Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, it may be difficult to influence end-of-life care once a patient is enrolled in hospice and served by a hospice team. 3. Patients without any visits (Evaluation & Management [E&M] or other) with any of the TINs associated with the attributed ACO during the measurement year and the year prior to the measurement year. Rationale: These patients are excluded because the start of their time-at-risk cannot be ascertained. 4. Patients not at risk for hospitalization at any time during the measurement year. Rationale: The outcomes for these patients cannot be assessed as they are not at risk. For example, if the first visit to the attributed ACO occurred after the patient has entered hospice, the patient would not have any time at risk and would thus be excluded. See section 2.4.3 of the attached MIPS MCC technical report for methods used to calculate person-time at risk. Clarification of 10-day buffer period:	The rationale for each exclusion is provided below: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. Rationale: The measure excludes these patients to ensure full data availability for outcome assessment and attribution. 2. Patients enrolled in hospice at any time during the year prior to the measurement year or at start of the measurement year. Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, ambulatory care providers may have relatively little influence on end-of-life care once a patient is enrolled in hospice and served by a hospice team. 3. Patients with no E&M visit to a MIPS eligible clinician. Rationale: The measure excludes these patients because they could not be attributed to a provider using the visit-based attribution algorithm (see Section S.6 for details). 4. Patients assigned to clinicians who do not participate in the QPP on the MIPS track. Rationale: These patients are excluded because the clinicians to whom they are assigned do not participate in MIPS. 5. Patients attributed to hematologists and oncologists. Rationale: The outcomes for patients who are predominantly cared for by hematologists and oncologists, including patients actively being managed for cancer, are unlikely to reflect the quality of care provided by primary care

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	The 10-day "buffer period" is a numerator (or outcome) exclusion (see section S.5) but it also affects the denominator (person-time at risk). Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care. Note that the patient is not removed from the denominator, we are just subtracting the 10-days of person-time. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.	provider (PCP) or other relevant specialists. The aim of this measure is not to assess the quality of care during such instances of active cancer treatment. Excluding patients assigned to hematologists and oncologists takes out of the measure patients who are being actively treated for cancer during the measurement period but retains in the measure patients with MCCs who have a history of cancer or are occasionally being seen by a cancer specialist for follow-up. 6. Patients not at risk for hospitalization during the measurement year. Rationale: The outcomes for these patients cannot be assessed as they are not at risk. For example, if the first attributed visit occurred after the patient has entered hospice, the patient would not have any time at risk and would thus be excluded. See section 2.4.3 of the attached methodology report for methods used to calculate person-time at risk. Clarification of 10-day buffer period: The 10-day "buffer period" is a numerator (or outcome) exclusion (see section S.5) but it also affects the denominator (person-time at risk). Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care. Note that the patient is not removed from the denominator, we are just subtracting the 10-days of person-time. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
Risk Adjustment	Statistical risk model	Statistical risk model
Stratification	Not applicable. This measure is not stratified.	N/A; this measure is not stratified.
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the	We begin by identifying the cohort of patients with MCCs by applying the inclusion/exclusion criteria. We then use the attribution algorithm to assign patients to TINs. Patients are assigned to the individual clinician most responsible for their care, and then subsequently to the TIN designated by the clinician, using our visit-based attribution algorithm. Attribution is done in the measurement period and only patients assigned to a MIPS-eligible clinician will be included in the measure score calculation. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within MIPS providers and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCCs patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to MIPS-eligible clinicians. Therefore, the "expected" number of admissions (described below) for each provider is based on the performance of all eligible MIPS providers nationwide. The second level of the model estimates a random-intercept term that reflects the provider's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
	predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation. We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation.	to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MIPS providers. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MIPS providers – for ease of interpretation. We begin by identifying the cohort of patients with MCCs by applying the inclusion/exclusion criteria. We then use the attribution algorithm to assign patients to TINs. Patients are assigned to the individual clinician most responsible for their care, and then subsequently to the TIN designated by the clinician, using our visit-based attribution algorithm. Attribution is done in the measurement period and only patients assigned to a MIPS-eligible clinician will be included in the measure score calculation. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within MIPS providers and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCCs patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to MIPS-eligible clinicians. Therefore, the "expected" number of admissions (described below) for each provider is based on the performance of all eligible MIPS providers nationwide. The second level of the model estimates a random-intercept term that reflects the provider's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size.

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
		The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MIPS providers. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MIPS providers – for ease of interpretation.

Measure	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System
Submission items	5.1 Identified measures: 3597 : Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System (MIPS MCC measure): The measure specifications are harmonized to the fullest extent possible. The only differences are for the CMS programs and measurement levels for which they are intended: for example, the MIPS measure is attributed and scored for clinician groups under MIPS, and the ACO MCC admission measure is attributed and scored for Medicare ACOs. Hospitalizations for Ambulatory Care Sensitive Conditions for Dual-Eligible Beneficiaries Unlike this updated measure which is specified for evaluating ACOs, the ACSC DE measure is a state-level measure. The cohorts, outcomes, and the risk-adjustment models differ accounting for differences in their target populations and measurement settings. -Cohort: Unlike the ACO MCC measure which targets patients with two or more of eight chronic conditions age >65 years, the ACSC DE measure targets dual-eligible adults age >18 years within each state; it does not focus on patients with certain chronic conditions. -Outcome: Unlike the ACO MCC measure which targets unplanned admissions, the ACSC DE measure is a composite of ACSC admissions. The ACSC DE measure outcome is ACSC admissions per 1,000 beneficiaries for ACSC by chronic, acute, and both conditions -Risk adjustment: Like the ACO MCC measure, the ACSC DE measure is risk-adjusted. Both measures adjust for patient demographics and comorbidities defined by Condition Categories (CCs). Specifically, the ACSC measure adjusts for age and sex, comorbidities, condition interactions, disability-by-condition interactions, and the total number of conditions. 5b.1 If competing, why superior or rationale for additive value: N/A	5.1 Identified measures: 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: The measure specifications are harmonized to the fullest extent possible. The only differences are for the CMS programs and measurement levels for which they are intended: for example, the MIPS measure is attributed and scored for clinician groups under MIPS, and the ACO MCC admission measure is attributed and scored for Medicare ACOs. 5b.1 If competing, why superior or rationale for additive value: N/A;there are no competing measures.

Comparison of NQF #0330, NQF #0229, NQF #0505, NQF #1789 and NQF #1891

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	The measure estimates a hospital-level 30-day, all-cause, risk-standardized mortality rate for patients discharged from the hospital with a principal diagnosis of HF. Mortality is defined as death for any cause within 30 days after the date of admission for the index admission. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. 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. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) 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 and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				the discharge date from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure 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	hospitalized in Veterans Health Administration (VA) facilities.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				the measure for patients who are 65 years or older, are enrolled in Medicare FFS, and are ACO assigned beneficiaries. The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.	
Type	Outcome	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, and inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.	Claims Data sources for the Medicare FFS measure: HWR 1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index	for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and	Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains administrative data for VA inpatient and outpatient services including: inpatient hospital care, outpatient	were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission	demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual-eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_HFreadmission_Fall2020_final_7.22.20.xlsx	outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score. References: Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and	hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a	ACR 1. Medicare Part A claims data for calendar years 2013, 2014, and 2015. 2. Medicare Enrollment Database (EDB). Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx	admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_COPDreadmission_Fall2020_final_7.22.20.xlsx

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
		hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_HFmortality_Fall2020_final_7.22.20.xlsx	merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_AMIreadmission_Fall2020_final_7.22.20.xlsx		
Level	Facility	Facility	Facility	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital, Outpatient Services	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. 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	The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days from the date of admission for patients 65 and older hospitalized with a principal diagnosis of HF.	The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30	The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for 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 outcome for this 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 the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	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. Additional details are provided in S.5 Numerator Details.		days after discharge from the index admission, only the first 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. Additional details are provided in S.5 Numerator Details.	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.	than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.
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 HF admission, excluding planned readmissions as defined below.	The measure counts all deaths (including in-hospital deaths) for any cause within 30 days of the date of the index HF admission.	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index AMI admission, excluding	Outcome definition The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission,	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index COPD admission, excluding planned

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative 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/radiotherapy/ 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.	Identifying deaths in the FFS measure As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.	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 using Medicare and VA 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 (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation); 2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,	excluding planned readmissions as defined below. Rationale From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. It is important to note that for the HWR measure, a readmission is included as an	readmissions as defined below. Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA 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 (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

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).	index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure. 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,	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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the COPD measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				maintenance chemotherapy/radiotherapy/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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission" Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital	

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				Wide Measure Updates and Specifications Report. https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841	
Denominator Statement	The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details	This claims-based measure is used for a cohort of patients aged 65 years or older. The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of HF and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.7 Denominator Details.	The measure 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. ACR-Specific: 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.7 Denominator Details.	The cohort includes admissions for patients aged 65 or older, who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.9 Denominator Details.
Denominator Details	To be included in the measure cohort used in public	To be included in the measure cohort used in	To be included in the measure cohort used in	To be included in the measure cohort, patients	To be included in the measure cohort used in public

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	reporting, patients must meet the following additional inclusion criteria: 1. Principal discharge diagnosis of HF; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of heart failure 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries 3. Aged 65 or over 4. Not transferred from another acute care facility We have explicitly tested the measure for those aged 65+ years and those aged 65+ years (see Testing Attachment for details).	public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of AMI; 2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	must meet the following inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission; 2. Aged 65 or older; 3. Discharged alive from a non-federal short-term acute care hospital; and 4. Not transferred to another acute care facility. ACR- Specific: An additional criterion for the ACO version of this measure is 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 first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) procedure categories to the Surgery/Gynecology Cohort.	reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of COPD with exacerbation; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				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 CCS 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	

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.	
Exclusions	The 30-day HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA);	The mortality measures exclude index admissions for patients: 1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility; 2. With inconsistent or unknown vital status or other unreliable	The 30-day AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA);	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals; 2. Without at least 30 days post-discharge enrollment in Medicare FFS;	The 30-day COPD readmission measures exclude index admissions for patients: 1. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); and,

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	3. Admitted within 30 days of a prior index admission for HF; and 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.	demographic (age and gender) data; 3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission; 4. Discharged against medical advice (AMA); or 5. Patients undergoing left ventricular assist device (LVAD) implantation or heart transplantation during an index admission or who have a history of LVAD or heart transplant in the preceding year. For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort for each year.	3. Same-day discharges; or 4. Admitted within 30 days of a prior index admission for AMI.	3. Discharged against medical advice; 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.	3. Admitted within 30 days of a prior index admission for COPD.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Exclusion Details	The HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified by comparing the discharge	1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Patient length of stay and condition is identified from the admission claim. Rationale: This exclusion prevents inclusion of patients who likely did not have clinically significant HF. 2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years: 2) if the discharge date for a hospitalization is	The AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Same-day discharges. This information is	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB) Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice; identified using the discharge disposition indicator in claims data.	1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. COPD admissions within 30 days of discharge from a qualifying COPD index admission are identified by comparing the discharge date from the index admission with

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	date from the index admission with subsequent admission dates. Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be found in attached Data Dictionary). Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.	before the admission date; 3) if the patient has a sex other than 'male' or 'female'. Rationale: Reliable and consistent data are necessary for valid calculation of the measure. 3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice data and the Inpatient standard analytic file (SAF). Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care. 4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and	identified in claims data. Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs. 4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.	Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of	subsequent admission dates. Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
		prepare the patient for discharge. 5. Patients with LVAD implantation or heart transplantation during an index admission or in the previous 12 months are identified by the corresponding codes for these procedures included in claims data. Rationale: Patients undergoing implantation of an LVAD designed to offer intermediate to long-term support (weeks to years) as a bridge to heart transplant or destination therapy represent a clinically distinct, highly-selected group of patients cared for at highly specialized medical centers.		their cancer remain in the measure.	
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	N/A	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Algorithm	The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF 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 and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after	The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for HF 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 and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-	The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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 at the hospital, 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	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals,

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	adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or	independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance	independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular	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 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	then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission

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	better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. The results are log transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each	given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-	hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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	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 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	rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF using hierarchical logistic regression models. In brief, the approach	specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology]. References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-	the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology) References Normand S-LT, Shahian D, M,. Statistical and Clinical	calculate 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 attributed to a hospital to calculate 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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012).	reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD 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

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	simultaneously models data at the patient- and hospital-levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to	cause RSMRs following hospitalization for HF 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 and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If	Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient	ACR-specific: 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	between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator)	there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's	risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to	Readmission Measure: Final Technical Report. 2012; https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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	readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period. This calculation transforms the ratio of predicted over	performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and	"expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to	normal distribution. The hospital effect represents the underlying risk of a readmission at the hospital, 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 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	on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005.	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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology]. References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	get a predicted value. The "expected" number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology)	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	regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
			References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226	risk factors 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 calculate 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 attributed to a hospital to calculate 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	

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				hospital using a volume-weighted geometric mean to create a hospital-wide combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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	

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				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; https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	
Submission items	5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. 0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR)	5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization 0358 : Heart Failure Mortality Rate (IQI 16) 0468 : Hospital 30-day, all-cause, risk-standardized	5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 0329 : Risk-Adjusted 30-Day All-Cause Readmission Rate 0330 : Hospital 30-day, all-cause, risk-standardized	5.1 Identified measures: 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization 0275 : Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	Following Heart Failure (HF) Hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF) 2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes	mortality rate (RSMR) following pneumonia hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization 3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure 3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale,	0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI) 2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)	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 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 5a.1 Are specs completely harmonized? No	1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).	5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).	5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission.	outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
		5b.1 If competing, why superior or rationale for additive value: N/A	5b.1 If competing, why superior or rationale for additive value: N/A	NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned	

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
				readmissions. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	

Comparison of NQF #0330, NQF #2879, NQF #2880 and NQF #2888

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of hospital discharge for any eligible condition. 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. The measure also indicates the hospital-level standardized readmission 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 readmissions are planned and do not count in the readmission outcome. The target population is Medicare Fee-for-Service (FFS) beneficiaries who are 65 years or older, and hospitalized in non-federal hospitals.	The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.	Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
		This Hybrid HWR measure is a re-engineered version of the HWR measure 1789, the Hospital-Wide All-Cause Unplanned Readmission Measure, which was developed for patients 65 years and older using Medicare claims and is currently publicly reported in the Hospital Inpatient Quality Reporting Program. This reengineered measure uses clinical data elements from patients' electronic health records in addition to claims data for risk adjustment.		
Type	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, and inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several	Claims, Electronic Health Data Data sources for the Medicare FFS measure: 1. Medicare Part A inpatient claims: This data source contains claims data for FFS inpatient services including: Medicare inpatient hospital care as well as inpatient physician claims for the 12 months prior to and including the index admission. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on	Claims, Other Data sources for the Medicare FFS measure: 1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.	Claims, Enrollment Data, Other Medicare administrative claims and enrollment data from calendar years 2017 and 2018, 2013-2017 American Community Survey, and 2017-2018 Area Health Resource File. No data collection instrument provided Attachment NQF_ACO_MCC_DataDictionary_07.09.20.xlsx

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated	admission and following discharge from index admission. 3. Patients' electronic health records: The clinical data elements used in the risk models for this measure will be derived from patients EHRs. The measure was developed and tested using data from EHRs. No data collection instrument provided Attachment NQF_2879_Hybrid_HWR_NQF_Data_Dictionary_v1.0_final_12-20-18-637387160536406094.xlsx	2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). Reference: Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx	

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_HFreadmission_Fall2020_final_7.22.20.xlsx			
Level	Facility	Facility	Facility	Other
Setting	Inpatient/Hospital	Inpatient/Hospital	Emergency Department and Services, Inpatient/Hospital	Outpatient Services

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. 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. Additional details are provided in S.5 Numerator Details.	The outcome for this 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 this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization. Additional details are provided in S.5 Numerator Details.	The outcome for this measure is the number of acute unplanned hospital admissions per 100 person-years at risk for admission during the measurement period.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
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 HF 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 using Medicare claims and VA administrative 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/radiotherapy/ immunotherapy, rehabilitation); 2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,	Outcome definition The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below. Rationale Planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. 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	Outcome Definition The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted. Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the	Outcome Definition The outcome for this measure is the number of acute, unplanned hospital admissions per 100 person-years at risk for admission during the measurement period. Time Period Number of admissions are counted while the patient is considered at risk for an admission during the measurement year. Excluded Admissions The numerator (outcome) does not include the following admissions because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of MCC patients: 1. Planned hospital admissions; 2. Admissions that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility; 3. Admissions that occur within a 10-day “buffer period” of time after discharge from a hospital, SNF, or acute rehabilitation facility; 4. Admissions that occur after the patient has entered hospice; 5. Admissions related to complications of procedures or surgeries;

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).	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/radiotherapy/ 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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see the report titled "2018 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0" Simoes J, Grady J, Purvis D, et al. 2018 All-Cause Hospital Wide Measure Updates and Specifications Report. http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPu	index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care. All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted. The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to	6. Admissions related to accidents or injuries; or 7. Admissions that occur prior to the first visit with the assigned clinician or clinician group. Clarification regarding the 10-day "buffer period" The 10-day "buffer period" is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
		blic%2FPage%2FQnetTier4&cid=1219069855841. Accessed November 6, 2018.	30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period. 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 (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	Identification of planned admissions To identify planned admissions, the measure adopted an algorithm previously developed for CMS's hospital readmission measures, CMS's Planned Readmission Algorithm Version 4.0. [1,2] In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip replacement or cholecystectomy). Admissions for an acute illness are never considered planned. For specific codes included in the planned admission algorithm, please see Tables PAA1-PAA4 with the codes for the CMS Planned Admission Algorithm in the accompanying data dictionary. Identification of admissions that occur directly from a SNF or acute rehabilitation facility Claims for SNF and acute rehabilitation facility stays, which help determine the outcome

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
			applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance. For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology. Definition of Emergency Department Visit and Observation Stay We defined ED visits and observation stays using specified billing codes or revenue center codes identified in	definition, were obtained using CMS's Integrated Data Repository (IDR). Identification of admissions that occur after the patient has entered hospice The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for the measurement year and the year prior were obtained from the CMS Medicare Enrollment Database. Identification of admissions related to complications of procedures or surgeries (including small bowel obstruction), and accidents or injuries Using the Agency for Healthcare Research and Quality's (AHRQ's) Clinical Classifications Software (CCS), which clusters diagnoses into clinically meaningful categories using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, we exclude from the outcome admissions related to the following 23 CCS categories. For specific ICD codes included, please refer to AHRQ's CCS Version 2019.1, Fiscal Year 2020. a. Complications of procedures or surgeries 1. 145: Intestinal obstruction without hernia 2. 237: Complication of device; implant or graft

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
			Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.	3. 238: Complications of surgical procedures or medical care 4. 257: Other aftercare b. Accidents or injuries 5. 2601 E Codes: Cut/pierce 6. 2602 E Codes: Drowning/submersion 7. 2604 E Codes: Fire/burn 8. 2605 E Codes: Firearm 9. 2606 E Codes: Machinery 10. 2607 E Codes: Motor vehicle traffic (MVT) 11. 2608 E Codes: Pedal cyclist; not MVT 12. 2609 E Codes: Pedestrian; not MVT 13. 2610 E Codes: Transport; not MVT 14. 2611 E Codes: Natural/environment 15. 2612 E Codes: Overexertion 16. 2613 E Codes: Poisoning 17. 2614 E Codes: Struck by; against 18. 2615 E Codes: Suffocation 19. 2616 E Codes: Adverse effects of medical care 20. 2618 E Codes: Other specified and classifiable 21. 2619 E Codes: Other specified; NEC

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				22. 2620 E Codes: Unspecified 23. 2621 E Codes: Place of occurrence Citations 1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018. 2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Denominator Statement	The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details	The measure 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. Additional details are provided in S.7 Denominator Details.	The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF. The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	Patients included in the measure (target patient population) The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs). Attribution: The outcome is attributed to the ACO to which the patient is assigned. (More details are provided in the next section.) Person-time at risk Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria: 1. Principal discharge diagnosis of HF; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the	To be included in the measure cohort, patients must meet the following additional inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission; 2. Aged 65 or over;	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Have a principal diagnosis of HF; 2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A	Patients included in the measure (target patient population) The cohort, or group of patients included in the measure, is comprised of patients whose combinations of chronic conditions put them at high risk of admission and whose admission rates could be lowered through better care. This definition

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	3. Discharged alive from a non-federal short-term acute care hospital; and, 4. Not transferred to another acute care facility. 5. The measure first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) 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 CCS 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	during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and, 5. Not transferred to another acute care facility. Cohort codes are included in the attached data dictionary.	reflects NQF's "Multiple Chronic Conditions Measurement Framework," which defines patients with MCCs as people "having two or more concurrent chronic conditions that … act together to significantly increase the complexity of management, and affect functional roles and health outcomes, compromise life expectancy, or hinder self-management." [1] The specific inclusion criteria are as follows: 1. Patient is alive at the start of the measurement period and has two or more of nine chronic condition disease groups in the year prior to the measurement period. Chronic conditions, except for diabetes, are defined using CMS's Chronic Conditions Data Warehouse (CCW). For diabetes, we used the diabetes cohort definition from the Accountable Care Organization (ACO) diabetes admission measure developed by CORE (v2018a ACO-36) as opposed to the definition used in CCW, which includes diagnoses for secondary and drug-induced diabetic conditions that are not the focus of the MIPS MCC admission measure. See Table 1 in the accompanying data dictionary for the specific codes used

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
		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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts are attached in the data dictionary.		to define the nine cohort-qualifying conditions. 1. Acute myocardial infarction (AMI), 2. Alzheimer's disease and related disorders or senile dementia, 3. Atrial fibrillation, 4. Chronic kidney disease (CKD), 5. Chronic obstructive pulmonary disease (COPD) or asthma, 6. Depression, 7. Diabetes, 8. Heart failure, and 9. Stroke or transient ischemic attack (TIA). Rationale: As noted above, this definition of MCCs is consistent with NQF's "Multiple Chronic Conditions Measurement Framework" and except for diabetes, is the same as the original ACO MCC measure [2]. Diabetes was added as a cohort-qualifying condition based on input from our TEP for the MIPS version of this measure, and further guidance from CMS. The inclusion of diabetes acknowledges the complexity that diabetes introduces to caring for patients with MCCs. 2. Patient is aged =65 years at the start of the year prior to the measurement period.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult. 3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period. Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment. 4. Patient is attributed to a Medicare Shared Savings Program ACO. Rationale: This measure is designed for ACOs that are part of MSSP and thus includes patients with MCCs who are attributed to one of the MSSP ACOs. The outcome is attributed to the ACO to which the patient is assigned. Patients are assigned to ACOs according to the specific ACO program assignment algorithm. This measure is limited to ACOs that are part of the Medicare Shared Savings Program (MSSP)where patients are retrospectively assigned to an ACO if they obtained the plurality of their primary care through the ACO's

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				providers during the measurement year. Information on ACO beneficiary assignment can be found here: https://www.cms.gov/Medicare/Medicare-Feefor-Service-Payment/sharedsavingsprogram/Downloads/Shared-Savings-Losses-Assignment-Spec-V6.pdf. Citations 1. National Quality Forum. Multiple Chronic Conditions Measurement Framework. http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227. Accessed February 20, 2019. 2. Drye EE, Altaf FK, Lipska KJ et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018; 56(2):193-201.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Exclusions	The 30-day HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Admitt. ed within 30 days of a prior index admission for HF; and 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.	The Hybrid HWR 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 Medicare FFS; 3. Discharged against medical advice (AMA); 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.	The measure excludes index hospitalizations that meet any of the following exclusion criteria: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS 2. Discharged against medical advice 3. HF admissions within 30 days of discharge from a prior HF index admission 4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.	The measure excludes the following patients: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. 2. Patient enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year. 3. Patients without any visits with any of the TINs associated with the attributed ACO during the measurement year or the year prior to the measurement year. 4. Patients not at risk for hospitalization during the measurement year.
Exclusion Details	The HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are	The Hybrid HWR measure excludes index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to	The measure excludes index hospitalizations that meet any of the following exclusion criteria: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB). Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine	The rationale for each exclusion is provided below: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. Rationale: The measure excludes these patients to ensure full data availability for outcome assessment and attribution. 2. Patients enrolled in hospice during the year prior to the measurement year or at the start of the measurement year.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be	determine whether a patient was readmitted. 3. Discharged against medical advice Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.	whether a patient visited the ED, was placed under observation, or was readmitted. 2. Discharged against medical advice, identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).	Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, it may be difficult to influence end-of-life care once a patient is enrolled in hospice and served by a hospice team. 3. Patients without any visits (Evaluation & Management [E&M] or other) with any of the TINs associated with the attributed ACO during the measurement year and the year prior to the measurement year. Rationale: These patients are excluded because the start of their time-at-risk cannot be ascertained. 4. Patients not at risk for hospitalization at any time during the measurement year. Rationale: The outcomes for these patients cannot be assessed as they are not at risk. For example, if the first visit to the attributed ACO occurred after the patient has entered hospice, the patient would not have any time at risk and would thus be excluded. See section 2.4.3 of the attached MIPS MCC technical report for methods used to calculate person-time at risk. Clarification of 10-day buffer period:

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	found in attached Data Dictionary). Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.			The 10-day "buffer period" is a numerator (or outcome) exclusion (see section S.5) but it also affects the denominator (person-time at risk). Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care. Note that the patient is not removed from the denominator, we are just subtracting the 10-days of person-time. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A; this measure is not stratified.	Not applicable. This measure is not stratified.
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF 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 and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the	The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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 at the hospital, after accounting for patient risk. The	The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.	We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's	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 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	Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges. To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.	(NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period.	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 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	The random effects hurdle models are described fully in the original measure methodology report (Horwitz et al., 2015). References: 1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report. EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes. Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care	based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation. We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF 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 and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-	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). References: Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012. Accessed August 3, 2018. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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	after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges. To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period. The random effects hurdle models are described fully in the original measure methodology report (Horwitz et al., 2015). References: 1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure	the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of

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	specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a	hospital effect represents the underlying risk of a readmission at the hospital, 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 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	(Version 1.0) Final Measure Methodology Report.	admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation.

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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-	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 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.		

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005.	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). References: Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.		
Submission items	5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. 0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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)	5.1 Identified measures: 5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value:	5.1 Identified measures: 3597 : Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: Clinician-Group Risk-Standardized

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF) 2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes	following acute myocardial infarction (AMI) hospitalization. 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization 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) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: We did not include in our list of related measures any non-outcome		Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System (MIPS MCC measure): The measure specifications are harmonized to the fullest extent possible. The only differences are for the CMS programs and measurement levels for which they are intended: for example, the MIPS measure is attributed and scored for clinician groups under MIPS, and the ACO MCC admission measure is attributed and scored for Medicare ACOs. Hospitalizations for Ambulatory Care Sensitive Conditions for Dual-Eligible Beneficiaries Unlike this updated measure which is specified for evaluating ACOs, the ACSC DE measure is a state-level measure. The cohorts, outcomes, and the risk-adjustment models differ accounting for differences in their target populations and measurement settings. -Cohort: Unlike the ACO MCC measure which targets patients with two or more of eight chronic conditions age >65 years, the ACSC DE measure targets dual-eligible adults age >18 years within each state; it does not focus on patients with certain chronic conditions. -Outcome: Unlike the ACO MCC measure which targets unplanned admissions, the ACSC DE measure is a

Measure	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	measures, such as process measures, with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). The proposed Hybrid HWR measure is a reengineered version of the HWR measure (NQF #1789) in that the proposed measure uses clinical data elements collected from EHR in addition to claims data for risk adjustment. The measure listed above uses only claims data for risk adjustment. In order for CMS to implement this measure in HIQR, there must be a requirement for IPPS hospitals to submit the clinical data elements required for measure calculation. This requirement is not yet in place and there is no current timetable for implementation. However, once the CCDE are collected, this Hybrid measure may replace the claims-only measure.		composite of ACSC admissions. The ACSC DE measure outcome is ACSC admissions per 1,000 beneficiaries for ACSC by chronic, acute, and both conditions -Risk adjustment: Like the ACO MCC measure, the ACSC DE measure is risk-adjusted. Both measures adjust for patient demographics and comorbidities defined by Condition Categories (CCs). Specifically, the ACSC measure adjusts for age and sex, comorbidities, condition interactions, disability-by-condition interactions, and the total number of conditions. 5b.1 If competing, why superior or rationale for additive value: N/A

Comparison of NQF #0505, NQF #0230, NQF #0330, NQF #0730 and NQF #1789

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Agency for Healthcare Research and Quality	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans	The measure estimates a hospital-level 30-day risk-standardized mortality rate (RSMR) for patients discharged from the hospital with a principal diagnosis of AMI. Mortality is defined as death for any cause within 30 days after the date of admission for the index admission. CMS annually reports the measure for patients who are 65 years or older and are either Medicare fee-for-service (FFS) beneficiaries and hospitalized in non-federal hospitals or are hospitalized in Veterans Health Administration (VA) facilities.	The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in	In-hospital deaths per 1,000 hospital discharges with acute myocardial infarction (AMI) as a principal diagnosis for patients ages 18 years and older. Excludes cases in hospice care at admission, obstetric discharges, and transfers to another hospital.	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. 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. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five specialty cohorts. The outcome is

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	Health Administration (VA) facilities.		Veterans Health Administration (VA) facilities.		defined as unplanned readmission for any cause within 30 days of the discharge date from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure within 30 days of hospital discharge. The ACR measure is calculated using the same

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					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 Medicare FFS, and are ACO assigned beneficiaries. The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.
Type	Outcome	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, and inpatient and outpatient physician claims for the 12	Claims While the measure is tested and specified using data from the Healthcare Cost and Utilization Project (HCUP) (see section 1.1 and 1.2 of the measure testing form), the measure specifications and software are specified to be used with any ICD-9-CM-coded administrative billing/claims/discharge dataset with Present on	Claims Data sources for the Medicare FFS measure: HWR 1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains administrative data for VA inpatient and outpatient	inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient	months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital	Admission (POA) information. Note that in Version 5.0, the AHRQ QI software no longer supports prediction of POA status using an embedded prediction module. Users are expected to provide POA data. Available at measure-specific web page URL identified in S.1 Attachment IQI_15_Acute_Myocardial_Infarction_Mortality_Rate.xlsx	each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission ACR 1. Medicare Part A claims data for calendar years 2013, 2014, and 2015.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the	hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score. References: Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals.	care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for		2. Medicare Enrollment Database (EDB). Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_AMIreadmission_Fall2020_final_7.22.20.xlsx	Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_AMImortality_Fall2020_final_7.22.20.xlsx	Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_HFreadmission_Fall2020_final_7.22.20.xlsx		
Level	Facility	Facility	Facility	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Hospital	Inpatient/Hospital, Outpatient Services
Numerator Statement	The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from	The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days from the date of admission for patients hospitalized with a principal diagnosis of AMI.	The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is	Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator	The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	the index admission, only the first 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. Additional details are provided in S.5 Numerator Details.		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. Additional details are provided in S.5 Numerator Details.		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.
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 AMI admission, excluding planned readmissions as defined below.	The measure counts all deaths (including in-hospital deaths) for any cause to any acute care hospital within 30 days of the date of the index AMI hospitalization. Identifying deaths in the FFS measure	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index HF admission, excluding planned readmissions as defined below.	N/A	Outcome definition The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA 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 (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	As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.	Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative 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/radiotherapy/ 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		readmissions as defined below. Rationale From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. It is important to note that for the HWR measure, a readmission is included as an index admission if it

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure. 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					chemotherapy/radiotherapy /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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission" Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Denominator Statement	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.7 Denominator Details.	This claims-based measure is used for patients aged 65 years or older. The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of AMI and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details	Discharges, for patients ages 18 years and older, with a principal ICD-10-CM diagnosis code for AMI	The measure 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. ACR-Specific: 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.7 Denominator Details.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of AMI; 2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Having a principal discharge diagnosis of AMI; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12	To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria: 1. Principal discharge diagnosis of HF; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12	AMI diagnosis codes: (MRTAMID) I2101 ST elevation (STEMI) myocardial infarction involving left main coronary artery I2102 ST elevation (STEMI) myocardial infarction involving left	To be included in the measure cohort, patients must meet the following inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission;

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	months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; and 4. Not transferred from another acute care facility. We have explicitly tested the measure for those aged 65+ years (see Testing Attachment for details).	months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	anterior descending coronary artery I2109 ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall I2111 ST elevation (STEMI) myocardial infarction involving right coronary artery I2119 ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall I2121 ST elevation (STEMI) myocardial infarction involving left circumflex coronary artery I2129 ST elevation (STEMI) myocardial infarction involving other sites I213 ST elevation (STEMI) myocardial infarction of unspecified site I214 Non-ST elevation (NSTEMI) myocardial infarction	2. Aged 65 or older; 3. Discharged alive from a non-federal short-term acute care hospital; and 4. Not transferred to another acute care facility. ACR- Specific: An additional criterion for the ACO version of this measure is 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 first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				I220 Subsequent ST elevation (STEMI) myocardial infarction of anterior wall I221 Subsequent ST elevation (STEMI) myocardial infarction of inferior wall I222 Subsequent non-ST elevation (NSTEMI) myocardial infarction I228 Subsequent ST elevation (STEMI) myocardial infarction of other sites I229 Subsequent ST elevation (STEMI) myocardial infarction of unspecified site	four remaining specialty cohorts based on the AHRQ CCS 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Exclusions	The 30-day AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Same-day discharges; or 4. Admitted within 30 days of a prior index admission for AMI.	The mortality measures exclude index admissions for patients: 1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility; 2. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data; 3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission; or 4. Discharged against medical advice (AMA). For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort.	The 30-day HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Admitted within 30 days of a prior index admission for HF; and 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.	Exclude cases transferring to another short-term hospital (DISP=2); cases in hospice care at admission (PointOFOriginUB04=F); MDC 14 (pregnancy, childbirth, and puerperium); with missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing), or principal diagnosis (DX1=missing).	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals; 2. Without at least 30 days post-discharge enrollment in Medicare FFS; 3. Discharged against medical advice; 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Exclusion Details	The AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Same-day discharges. This information is identified in claims data.	1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Patient length of stay and condition is identified from the admission claim. Rationale: This exclusion prevents inclusion of patients who likely did not have clinically significant AMI. 2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years; 2) if the discharge date for a hospitalization is before the admission date; and 3) if the patient has a sex other than 'male' or 'female'.	The HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified	N/A	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB) Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice; identified using the

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs. 4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.	Rationale: Reliable and consistent data are necessary for valid calculation of the measure. 3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice data. This exclusion applies when the measure is used in Medicare FFS patients only. Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care. 4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.	by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be found in attached Data Dictionary). Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.		discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for

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					other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	No risk adjustment or risk stratification	Statistical risk model
Stratification	N/A	N/A	N/A	Not applicable	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical	The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for AMI 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 and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the	The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF 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 and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept.	The observed rate is the number of discharge records where the patient experienced the QI adverse event divided by the number of discharge records at risk for the event. Risk adjustment is available for the AHRQ QI ICD-9-CM v6.0 specifications. However, risk adjustment is not currently included in the ICD-10-CM/PCS v6.0 of the AHRQ QI specifications, due to the transition to ICD-10-CM/PCS (October 1, 2015). At least one full year of data coded in ICD-10-CM/PCS is needed in order to develop	The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital readmission within 30 days of discharge using age, selected clinical covariates, and a hospital-specific

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on	hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This	At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the	robust risk adjustment models. A full year of ICD-10-CM/PCS coded all-payer data will not be available until mid-2017. AHRQ will announce an anticipated date as soon as one is known. The AHRQ QI v6.0 software (SAS and WinQI) for use with ICD-10-CM/PCS produces observed rates, which may be used to evaluate performance within hospitals. However, caution should be used when comparing observed rates across hospitals because observed rates do not account for differences in patient populations (i.e., case mix). The observed rate is the number of discharge records where the patient experienced the QI adverse event divided by the number of discharge records at risk for the event. Risk adjustment is available for the AHRQ QI ICD-9-CM v6.0 specifications. However, risk adjustment is	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 at the hospital, 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 SRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at

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	the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept	approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner,	denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the	not currently included in the ICD-10-CM/PCS v6.0 of the AHRQ QI specifications, due to the transition to ICD-10-CM/PCS (October 1, 2015). At least one full year of data coded in ICD-10-CM/PCS is needed in order to develop robust risk adjustment models. A full year of ICD-10-CM/PCS coded all-payer data will not be available until mid-2017. AHRQ will announce an anticipated date as soon as one is known. The AHRQ QI v6.0 software (SAS and WinQI) for use with ICD-10-CM/PCS produces observed rates, which may be used to evaluate performance within hospitals. However, caution should be used when comparing observed rates across hospitals because observed rates do not account for differences in patient populations (i.e., case mix).	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.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national	but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology]. References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005).		For each specialty cohort, the "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors 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 calculate 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 attributed to a hospital to calculate an expected value. To assess hospital performance for

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology) References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian, 2007). At the patient level,	2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for AMI and HF 30-Day Mortality Methodology. 2005. The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for AMI 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 and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a	References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF 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 and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept.		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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate.	distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average	At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the		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; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the approach simultaneously models data

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by	hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance	denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the		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 hospital 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 at the hospital, 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period.	for each reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology]. References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for AMI and HF 30-Day Mortality Methodology. 2005.	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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005).		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 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226		References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005.		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 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 calculate a predicted value. The "expected" number of

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					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 attributed to a hospital to calculate 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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012).

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					ACR-specific: 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-

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					Cause Unplanned Readmission Measure: Final Technical Report. 2012; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.
Submission items	5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization 0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia 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	5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. 0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure	5.1 Identified measures: 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization for patients 18 and older 2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: The indicators referenced above include 30-day mortality 1) for patients age 18 years and older 2)	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI) 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome	0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization 1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization 2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI) 3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure 3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact:	with Claims and Electronic Health Record Data 2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF) 2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-	specified as an e-measure and 3) for patients age 65 and older. Inpatient mortality and 30-day mortality are different concepts, although capturing the same ultimate outcome. Harmonization is not appropriate. 5b.1 If competing, why superior or rationale for additive value: IQI 15 and the Centers for Medicare & Medicaid Services' NQF-endorsed measures concerning AMI mortality (0230 and 2473) use the same ICD-9-CM codes to identify AMI, but they differ in two important respects: (1) whereas the CMS measures concern only Medicare fee-for-service and VA beneficiaries 65 years or older, IQI 15 measures mortality among hospitalizations of patients 18 years or older at non-federal acute care hospitals for all payers; and (2) while the CMS measures evaluate	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 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	30-day mortality, IQI 15—because it is based only on UB-04 data elements—is limited to inpatient mortality. The latter difference is a potential disadvantage in that the time at risk is not uniform for all patients and 30-day mortality is typically greater than inpatient mortality, but the former difference is an advantage because IQI 15 encompasses a greater proportion of the entire population at risk. We therefore believe that #0730 complements #0230 by offering an alternative specification for users who are interested in patients of all ages and all payers, just as #2473 offers an alternative e-measure specification for those with electronic health data.	target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore,

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization	0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	0730: Acute Myocardial Infarction (AMI) Mortality Rate	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
					non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A

Comparison of NQF #0505, NQF #2431, NQF #2879 and NQF #2881

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services (CMS)
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI).	This measure estimates hospital-level, risk-standardized payment for an AMI episode-of-care starting with inpatient admission to a short term acute-care facility and extending 30 days post-admission for Medicare fee-for-service (FFS) patients who are 65 years of age	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of hospital discharge for any eligible condition. The measure reports a single summary RSRR, derived from	Measure score: The measure is a risk standardized score at the hospital level for days spent in acute care for patients with an AMI. Measure focus and time frame: This measure estimates days spent in acute care (i.e. time spent in ED, unplanned

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	or older with a principal discharge diagnosis of AMI.	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. The measure also indicates the hospital-level standardized readmission 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 readmissions are planned and do not count in the readmission outcome. The target population is Medicare Fee-for-Service (FFS) beneficiaries who are 65 years or older, and hospitalized in non-federal hospitals. This Hybrid HWR measure is a re-engineered version of the HWR measure 1789, the Hospital-Wide All-Cause Unplanned Readmission Measure, which was developed for patients 65 years and older using Medicare claims and is currently publicly reported in the Hospital Inpatient Quality Reporting Program. This reengineered measure uses clinical data elements from patients'	readmission and observation stays) within 30 days of discharge from an inpatient hospitalization for acute myocardial infarction (AMI) This measure is intended to capture the quality of care transitions provided to discharged patients hospitalized with AMI by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: 1) emergency department (ED) visits, 2) observation stays, and 3) unplanned readmissions at any time during the 30 days post-discharge. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm (PRA). Days spent in each care setting are aggregated for the 30 days post-discharge with a minimum of half-day increments (i.e. an ED visit lasting 2 hours would be counted as 0.5 days). Target population: CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
			electronic health records in addition to claims data for risk adjustment.	
Type	Outcome	Cost/Resource Use	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including	Claims, Enrollment Data Data Sources Medicare Inpatient and Outpatient Administrative Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims. The 2020 reporting period for these analyses include Medicare administrative claims and enrollment information for patients with hospitalizations between July 1, 2016 and June 30, 2019. Medicare administrative claims for the 12 months prior to and during the index admission are used for risk adjustment. The period for public reporting of the AMI payment measure aligns with the 30-day AMI mortality and readmission measures for harmonization purposes. The datasets also contain price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical	Claims, Electronic Health Data Data sources for the Medicare FFS measure: 1. Medicare Part A inpatient claims: This data source contains claims data for FFS inpatient services including: Medicare inpatient hospital care as well as inpatient physician claims for the 12 months prior to and including the index admission. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission. 3. Patients' electronic health records: The clinical data elements used in the risk models for this measure will be derived from patients EHRs. The measure was developed and tested using data from EHRs. No data collection instrument provided Attachment	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains administrative data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.	laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies). The CMS Standardization Methodology for Allowed Amount for 2009 through 2019 was applied to the claims to calculate the measures. Price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies) were calculated using standardized methodology specific to services reimbursed through Medicare parts A and B (for specific values see https://www.resdac.org/articles/cms-price-payment-standardization-overview). Medicare Enrollment Database (EDB) This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This dataset was used to obtain information on enrollment, date of birth, and post-discharge mortality status. These data have previously been shown to accurately reflect patient vital status (Fleming et al. 1992).	NQF_2879_Hybrid_HWR_NQF_Data_Dictionary_v1.0_final_12-20-18-637387160536406094.xlsx	Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	No data collection instrument provided Attachment NQF_datadictionary_AMIreadmission_Fall2020_final_7.22.20.xlsx	Medicare Fee Schedules Fee schedules are lists of pre-determined reimbursement amounts for certain services and supplies (e.g. physician services, independent clinical labs, ambulance services, durable medical equipment) and are used by Medicare in the calculation of payment to providers. We used the applicable fee schedules when calculating payments for claims that occurred in each care setting. Federal Register Final Rules for Medicare Prospective Payment Systems and Payment Policies Certain data necessary to calculate payments (e.g. annual base payments and conversion factors, DRG weights, wage indexes, and average length of stay) were taken from applicable Federal Register Final Rules. CMS-published Wage Index Data Wage index data not published in Federal Register Final Rules (such as the wage index data for Renal Dialysis Facilities) were obtained through the CMS website. American Community Survey (2013-2017) We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index		NQF_datadictionary_AMI-EDAC_Spring2021.xlsx

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
		score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). Reference Fleming, C., Fisher, E., Chang, C., Bubolz, T., & Malenka, D. (1992). Studying Outcomes and Hospital Utilization in the Elderly: The Advantages of a Merged Data Base for Medicare and Veterans Affairs Hospitals. Medical Care, 30(5), 377-391. Data Sources Medicare Inpatient and Outpatient Administrative Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims. The 2020 reporting period for these analyses include Medicare administrative claims and enrollment information for patients with hospitalizations between July 1, 2016 and June 30, 2019. Medicare administrative claims for the 12 months prior to and during the index admission are used for risk adjustment. The period for public reporting of the AMI payment		

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
		measure aligns with the 30-day AMI mortality and readmission measures for harmonization purposes. The datasets also contain price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies). The CMS Standardization Methodology for Allowed Amount for 2009 through 2019 was applied to the claims to calculate the measures. Price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies) were calculated using standardized methodology specific to services reimbursed through Medicare parts A and B (for specific values see https://www.resdac.org/articles/cms-price-payment-standardization-overview). Medicare Enrollment Database (EDB)		

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
		This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This dataset was used to obtain information on enrollment, date of birth, and post-discharge mortality status. These data have previously been shown to accurately reflect patient vital status (Fleming et al. 1992). Medicare Fee Schedules Fee schedules are lists of pre-determined reimbursement amounts for certain services and supplies (e.g. physician services, independent clinical labs, ambulance services, durable medical equipment) and are used by Medicare in the calculation of payment to providers. We used the applicable fee schedules when calculating payments for claims that occurred in each care setting. Federal Register Final Rules for Medicare Prospective Payment Systems and Payment Policies Certain data necessary to calculate payments (e.g. annual base payments and conversion factors, DRG weights, wage indexes, and average length of stay) were taken from applicable Federal Register Final Rules. CMS-published Wage Index Data Wage index data not published in Federal Register Final Rules (such as		

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
		the wage index data for Renal Dialysis Facilities) were obtained through the CMS website. American Community Survey (2013-2017) We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). Reference Fleming, C., Fisher, E., Chang, C., Bubolz, T., & Malenka, D. (1992). Studying Outcomes and Hospital Utilization in the Elderly: The Advantages of a Merged Data Base for Medicare and Veterans Affairs Hospitals. Medical Care, 30(5), 377-391. Attachment1 Attachment1		
Level	Facility	Facility	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and	N/A	The outcome for this 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	The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index AMI hospitalization. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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. Additional details are provided in S.5 Numerator Details.		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.	readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index AMI hospitalization. Additional details are provided in S.5 Numerator Details.
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 AMI admission, excluding planned readmissions as defined below. Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying	N/A	Outcome definition The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below. Rationale Planned readmissions are generally not a signal of quality of care.	Outcome Definition The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index AMI admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days).

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	readmissions as planned using Medicare and VA 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the		Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. 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	Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted. Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with AMI who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for AMI during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		chemotherapy/radiotherapy/ 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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see the report titled "2018 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0" Simoes J, Grady J, Purvis D, et al. 2018 All-Cause Hospital Wide Measure Updates and Specifications Report. http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841. Accessed November 6, 2018.	All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted. The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period. Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
				administrative 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 (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. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
				each measure's patient cohort. For the CMS 30-day AMI EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance. For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for AMI, version 4.0" posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology Definition of Emergency Department Visit and Observation Stay We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.
Denominator Statement	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission.	N/A	The measure 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	The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-federal and VA acute care hospitals for AMI. The cohort includes admissions for patients discharged from the

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	Additional details are provided in S.7 Denominator Details.		history for the 12 months prior to admission. Additional details are provided in S.7 Denominator Details.	hospital with a principal diagnosis of AMI and with continuous 12 months Medicare enrollment prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided n S.7 Denominator Details.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of AMI; 2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	N/A	To be included in the measure cohort, patients must meet the following additional inclusion criteria: 1. Enrolled in Medicare 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 measure first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams.	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Having a principal discharge diagnosis of AMI 2. Enrolled in Medicare FFS Part A and Part B for the first 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital; and, 5. Not transferred to another acute care facility. ICD-9 and ICD-10 cohort codes are included in the attached Data Dictionary.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
			The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ CCS 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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts are attached in the data dictionary.	

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
Exclusions	The 30-day AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Same-day discharges; or 4. Admitted within 30 days of a prior index admission for AMI.	Exclusion Criteria for AMI Payment Measure 1. Discharged against medical advice (AMA) Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge 2. Incomplete administrative data in the 30 days following the index admission if discharged alive. Rationale: This is necessary in order to identify the outcome (payments) in the sample over our analytic period. 3. Transferred to a federal hospital Rationale: We do not have claims data for these hospitals; therefore, including these patients would systematically underestimate payments. 4. Discharged alive on day of admission or following day and not transferred to another acute care facility. Rationale : This exclusion prevents inclusion of patients who likely did not have clinically significant AMI. 5. Not matched to admission in the AMI mortality measure Rationale: As part of the current data processing, we match our index AMI admissions to the AMI mortality cohort to obtain the risk-adjustment	The Hybrid HWR 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 Medicare FFS; 3. Discharged against medical advice (AMA); 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.	The measure excludes index hospitalizations that meet any of the following exclusion criteria: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS 2. Discharged against medical advice 3. Same-day discharges 4. AMI admissions within 30 days of discharge from a prior AMI index admission

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
		variables. Patients are excluded if they cannot be matched between the AMI payment and AMI mortality cohorts. 6. Missing index DRG weight where provider received no payment Rationale: With neither DRG weight or payment data, we cannot calculate a payment for the patient's index admission; this would make the entire episode of care appear significantly less expensive 7. Patients with inconsistent or unknown vital status or other unreliable demographic data Rationale: Reliable and consistent data are necessary for valid calculation of the measure. 8. Patients enrolled in the Medicare hospice program any time in the 12 months prior to the index admission, including on the first day of the index admission. Rationale: These patients are excluded to align with the 30-Day AMI Mortality measure.		
Exclusion Details	The AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA	For patients with more than one eligible admission for an AMI in a single year, only one index admission for AMI is randomly selected for inclusion in the cohort. Additional admissions within that year are excluded. When index admissions	The Hybrid HWR measure excludes index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals Rationale: These hospitals care for a unique population of patients that	The measure excludes index hospitalizations that meet any of the following exclusion criteria: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Same-day discharges. This information is identified in claims data. Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs. 4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.	occur during the transition between two years within the measurement period (that is, June/July 2017 or June/July 2018) and both are randomly selected for inclusion in a measure, the measures include only the June admission. July admissions within the 30-day outcome window of the June admission are excluded to avoid assigning payments for the same claims to two admissions.	cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these	are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB). Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted. 2. Discharged against medical advice, identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Same-day discharges, identified when the admission and discharge dates on the claim are equal. Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these admissions are for clinically significant AMIs. 4. AMI admissions within 30 days of discharge from a prior AMI index admission, identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional AMI admissions within 30 days are excluded as index

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.		admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.	admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	N/A

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
Type Score	Rate/proportion better quality = lower score	Continuous variable Results of the measure alone do not necessarily reflect the quality of care provided by hospitals but simply whether the total episode payments are greater than or less than would be expected for an average hospital with a similar case mix. Hospitals are classified as having a less than average, no different than average, or greater than average payment as compared to national average payment for an episode. Accordingly, a classification of lower than average payment should not be interpreted as better care. The AMI risk-standardized payment (RSP) is most meaningful when presented in the context of an AMI outcome measure, such as the publicly reported AMI mortality measure. This is because a measure of payments to hospitals that is aligned with a quality measure facilitates profiling hospital value (payments and quality).	Rate/proportion better quality = lower score	Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian,	We focused on a 30-day episode of care triggered by admission for an AMI as identified using ICD-10 diagnosis codes described in the data dictionary. The measure includes admissions for Medicare FFS beneficiaries aged 65 years and older. A full list of codes used to identify these conditions is provided in the data dictionary.	The measure estimates hospital-level 30-day all-cause RSRRs 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	The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for AMI using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part –

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that	We assigned all payments for the episode of care to the hospital that originally admitted the patient.	hospital 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 at the hospital, 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 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	with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes. Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The		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 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	To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period. The random effects hurdle models are described fully in the original measure methodology report (Horwitz et al., 2015). References: 1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Acute Myocardial Infarction (AMI) (Version 1.0) Final Measure Methodology Report. https://www.qualitynet.org/inpatient/measures/edac/methodology The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for AMI using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology) References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian, 2007). At the patient level,		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). References: Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012; https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841. Accessed August 3, 2018. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the	across hospitals lead to systematic differences in outcomes. Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges. To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

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	it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is		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 hospital 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 at the hospital, 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 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 random effects hurdle models are described fully in the original measure methodology report (Horwitz et al., 2015). References: 1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Acute Myocardial Infarction (AMI) (Version 1.0) Final Measure Methodology Report.

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and		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 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	

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology) References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226		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). References: Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012 Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
Submission items	5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI) 2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI) 5a.1 Are specs completely harmonized? Yes	5.1 Identified measures: 5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value:	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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 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) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive	5.1 Identified measures: 5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value:

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
	5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A		pulmonary disease (COPD) hospitalization 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: We did not include in our list of related measures any non-outcome measures, such as process measures, with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). The proposed Hybrid HWR measure is a reengineered version of the HWR measure (NQF #1789) in that the proposed measure uses clinical data elements collected from EHR in	

Measure	0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	2431: Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)
			addition to claims data for risk adjustment. The measure listed above uses only claims data for risk adjustment. In order for CMS to implement this measure in HIQR, there must be a requirement for IPPS hospitals to submit the clinical data elements required for measure calculation. This requirement is not yet in place and there is no current timetable for implementation. However, once the CCDE are collected, this Hybrid measure may replace the claims-only measure.	

Comparison of NQF #0506, NQF #0231, and NQF #1789

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Steward	Centers for Medicare & Medicaid Services	Agency for Healthcare Research and Quality	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index	In-hospital deaths per 1,000 hospital discharges with pneumonia as a principal diagnosis for patients ages 18 years and older. Excludes obstetric discharges and transfers to another hospital. [NOTE: The software provides the rate per hospital discharge. However, common practice reports the measure as per 1,000 discharges. The user must multiply the rate obtained from the software by 1,000 to report in-hospital deaths per 1,000 hospital discharges.]	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. 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. The measure also indicates the hospital-level

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.		standardized readmission 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 from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure 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 Medicare FFS, and are ACO assigned beneficiaries. The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.
Type	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital	Claims HCUP State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). 2008. Agency for Healthcare Research and Quality, Rockville, MD. HCUP State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). 2008. Agency	Claims Data sources for the Medicare FFS measure: HWR 1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample).

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the	for Healthcare Research and Quality, Rockville, MD. Attachment Attachment	Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission ACR 1. Medicare Part A claims data for calendar years 2013, 2014, and 2015. 2. Medicare Enrollment Database (EDB). Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_PNreadmission_Fall2020_final_7.22.20.xlsx		
Level	Facility	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital, Outpatient Services

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.	Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.	The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for 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.
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 pneumonia 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	Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.	Outcome definition The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below. Rationale

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	using Medicare claims and VA administrative 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the pneumonia measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. It is important to note that for the HWR measure, a readmission is included as an index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure. 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

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
			chemotherapy/radiotherapy/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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission" Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report.

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Denominator Statement	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	Discharges, for patients ages 18 years and older, with a principal ICD-9-CM diagnosis code for pneumonia.	The measure 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. ACR-Specific: 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.7 Denominator Details.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over;	ICD-9-CM Pneumonia diagnosis codes: 00322 SALMONELLA PNEUMONIA 0212 PULMONARY TULAREMIA 0391 PULMONARY ACTINOMYCOSIS 0521 VARICELLA PNEUMONITIS 0551 POSTMEASLES PNEUMONIA 0730 ORNITHOSIS PNEUMONIA 1124 CANDIDIASIS OF LUNG 1140 PRIMARY COCCIDIOIDOMYCOS 1144 CHRONIC PULMON COCCIDIOIDOMYCOSIS 1145 UNSPEC PULMON COCCIDIOIDOMYCOSIS 11505 HISTOPLASM CAPS PNEUMON 11515 HISTOPLASM DUB PNEUMONIA 11595 HISTOPLASMOSIS PNEUMONIA 1304 TOXOPLASMA PNEUMONITIS 1363 PNEUMOCYSTOSIS	To be included in the measure cohort, patients must meet the following inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission; 2. Aged 65 or older; 3. Discharged alive from a non-federal short-term acute care hospital; and 4. Not transferred to another acute care facility. ACR- Specific: An additional criterion for the ACO version of this measure is 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 first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ)

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. 5. Not transferred from another acute care facility.	4800 ADENOVIRAL PNEUMONIA 4801 RESP SYNCYT VIRAL PNEUM 4802 PARINFLUENZA VIRAL PNEUM 4803 PNEUMONIA DUE TO SARS 4808 VIRAL PNEUMONIA NEC 4809 VIRAL PNEUMONIA NOS 481 PNEUMOCOCCAL PNEUMONIA 4820 K. PNEUMONIAE PNEUMONIA 4821 PSEUDOMONAL PNEUMONIA 4822 H.INFLUENZAE PNEUMONIA 48230 STREP PNEUMONIA UNSPEC 48231 GRP A STREP PNEUMONIA 48232 GRP B STREP PNEUMONIA 48239 OTH STREP PNEUMONIA 4824 STAPHYLOCOCCAL PNEUMONIA 48240 STAPH PNEUMONIA UNSP 48241 METH SUS PNEUM D/T STAPH 48242 METH RES PNEU D/T STAPH 48249 STAPH PNEUMON OTH 48281 ANAEROBIC PNEUMONIA 48282 E COLI PNEUMONIA 48283 OTH GRAM NEG PNEUMONIA 48284 LEGIONNAIRES DX 48289 BACT PNEUMONIA NEC 4829 BACTERIAL PNEUMONIA NOS 4830 MYCOPLASMA PNEUMONIA 4831 CHLAMYDIA PNEUMONIA 4838 OTH SPEC ORG PNEUMONIA 4841 PNEUM W CYTOMEG INCL DIS 4843 PNEUMONIA IN WHOOP COUGH 4845 PNEUMONIA IN ANTHRAX	Clinical Classifications Software (CCS) 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 CCS 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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
		4846 PNEUM IN ASPERGILLOSIS 4847 PNEUM IN OTH SYS MYCOSES 4848 PNEUM IN INFECT DIS NEC 485 BRONCOPNEUMONIA ORG NOS 486 PNEUMONIA, ORGANISM NOS 4870 INFLUENZA WITH PNEUMONIA 48801 INFLUENZA D/T IDENTIFIED AVIAN INFLUENZA VIRUS 48811 INFLUENZA D/T IDENTIFIED 2009 H1N1 INFLUENZA VIRUS W/PNEUMONIA 48881 NOVEL INFLUENZA W/PNEUMONIA	
Exclusions	The 30-day pneumonia (PN) readmission measure excludes index admissions for patients: 1. Discharged against medical advice (AMA); 2. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 3. 3. Admitted within 30 days of a prior index admission for pneumonia.	Exclude cases: • transferring to another short-term hospital (DISP=2) • MDC 14 (pregnancy, childbirth, and puerperium) • with missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals; 2. Without at least 30 days post-discharge enrollment in Medicare FFS; 3. Discharged against medical advice; 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. 6. Admitted for medical treatment of cancer.
Exclusion Details	The pneumonia readmission measure excludes index admissions for patients: 1. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries),	Exclude cases: • transferring to another short-term hospital (DISP=2) • MDC 14 (pregnancy, childbirth, and puerperium) • with missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB)

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Pneumonia admissions within 30 days of discharge from a qualifying pneumonia index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.		Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice; identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	Not applicable	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for	The measure is expressed as a rate, defined as (outcome of interest / population at risk) or	The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's	(numerator / denominator). The AHRQ Quality Indicators (AHRQ QI) software performs six steps to produce the rate 1) Discharge-level data is used to identify inpatient records containing the outcome of interest and 2) the population at risk. 3) Calculate observed rates. Using output from steps 1 and 2, observed rates are calculated for user-specified combinations of stratifiers. 4) Calculate expected rates. Use the risk-adjustment model to calculate the rate one would expect at the hospital based on the hospital´s case-mix and the average performance for that case-mix in the reference population. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. For indicators that are not risk-adjusted, the risk-adjusted rate is the same as the observed rate. 6) Calculate smoothed rate. A Univariate shrinkage estimator is applied to the risk-adjusted rates. The shrinkage estimator reflects a reliability adjustment unique to each indicator and provider. The estimator is the signal-to-noise ratio, where signal is the between provider variance and noise is the within provider variance.	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 hospital 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 at the hospital, 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 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

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References:		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 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 calculate 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 attributed to a hospital to calculate 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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the		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; https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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 at the hospital, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models		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 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 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

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.		characteristics. The results are log-transformed and summed over all patients attributed to a hospital to calculate 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 attributed to a hospital to calculate 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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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:

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
			Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.
Submission items	5.1 Identified measures: 0231 : Pneumonia Mortality Rate (IQI #20) 0279 : Community Acquired Pneumonia Admission Rate (PQI 11) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2579 : Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN) 2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a	5.1 Identified measures: 0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: Yes 5b.1 If competing, why superior or rationale for additive value: AHRQ and CMS engaged in a harmonization process when both measures were submitted for endorsement. In-hospital mortality and 30-day mortality measures are complementary and provide alternative perspectives on hospital performance. In-hospital mortality measures may be calculated by the hospital in real time without the need to link to vital records or other sources of mortality data.	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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 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 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A		National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures.

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	0231: Pneumonia Mortality Rate (IQI #20)	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
			Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A

Comparison of NQF #0506, NQF #2579 and NQF #2882

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and	This measure estimates hospital-level, risk-standardized payment for an eligible pneumonia episode of care starting with inpatient admission to a short term acute-care facility and extending 30 days post-admission for Medicare fee-for-service (FFS) patients who are 65 years or older with a principal discharge diagnosis of pneumonia or principal discharge diagnosis of sepsis (not including severe sepsis) that have a secondary discharge diagnosis of pneumonia coded as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA.	This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
	unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.		stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.
Type	Outcome	Cost/Resource Use	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and	Claims, Enrollment Data Data Sources Medicare Inpatient and Outpatient Administrative Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims. The 2020 reporting period for these analyses include Medicare administrative claims and enrollment information for patients with hospitalizations between July 1, 2016 and June 30, 2019. Medicare administrative claims for the 12 months prior to and during the index admission are used for risk adjustment. The period for public reporting of the PN payment measure aligns with the 30-day PN mortality and readmission measures for harmonization purposes. The datasets also contain price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance	Claims, Enrollment Data Data sources for the Medicare FFS measure: 1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
	outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_PNreadmission_Fall2020_final_7.22.20.xlsx	services, and durable medical equipment, prosthetics/orthotics, and supplies). The CMS Standardization Methodology for Allowed Amount for 2009 through 2019 was applied to the claims to calculate the measures. Price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies) were calculated using standardized methodology specific to services reimbursed through Medicare parts A and B (for specific values see https://www.resdac.org/articles/cms-price-payment-standardization-overview). Medicare Enrollment Database (EDB) This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This dataset was used to obtain information on enrollment, date of birth, and post-discharge mortality status. These data have previously been shown to accurately reflect patient vital status (Fleming et al. 1992). Medicare Fee Schedules Fee schedules are lists of pre-determined reimbursement amounts for certain services and supplies (e.g. physician services, independent clinical labs, ambulance services, durable medical equipment) and are used by Medicare in the calculation of payment to providers. We used the applicable fee schedules when calculating payments for claims that occurred in each care setting.	Reference: Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		Federal Register Final Rules for Medicare Prospective Payment Systems and Payment Policies Certain data necessary to calculate payments (e.g. annual base payments and conversion factors, DRG weights, wage indexes, and average length of stay) were taken from applicable Federal Register Final Rules. CMS-published Wage Index Data Wage index data not published in Federal Register Final Rules (such as the wage index data for Renal Dialysis Facilities) were obtained through the CMS website. American Community Survey (2013-2017) We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). Reference Fleming, C., Fisher, E., Chang, C., Bubolz, T., & Malenka, D. (1992). Studying Outcomes and Hospital Utilization in the Elderly: The Advantages of a Merged Data Base for Medicare and Veterans Affairs Hospitals. Medical Care, 30(5), 377-391. Data Sources Medicare Inpatient and Outpatient Administrative Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing	

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		facility care, some home health agency services, as well as inpatient and outpatient physician claims. The 2020 reporting period for these analyses include Medicare administrative claims and enrollment information for patients with hospitalizations between July 1, 2016 and June 30, 2019. Medicare administrative claims for the 12 months prior to and during the index admission are used for risk adjustment. The period for public reporting of the PN payment measure aligns with the 30-day PN mortality and readmission measures for harmonization purposes. The datasets also contain price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies). The CMS Standardization Methodology for Allowed Amount for 2009 through 2019 was applied to the claims to calculate the measures. Price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies) were calculated using standardized methodology specific to services reimbursed through Medicare parts A and B (for specific values see https://www.resdac.org/articles/cms-price-payment-standardization-overview).	

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		Medicare Enrollment Database (EDB) This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This dataset was used to obtain information on enrollment, date of birth, and post-discharge mortality status. These data have previously been shown to accurately reflect patient vital status (Fleming et al. 1992). Medicare Fee Schedules Fee schedules are lists of pre-determined reimbursement amounts for certain services and supplies (e.g. physician services, independent clinical labs, ambulance services, durable medical equipment) and are used by Medicare in the calculation of payment to providers. We used the applicable fee schedules when calculating payments for claims that occurred in each care setting. Federal Register Final Rules for Medicare Prospective Payment Systems and Payment Policies Certain data necessary to calculate payments (e.g. annual base payments and conversion factors, DRG weights, wage indexes, and average length of stay) were taken from applicable Federal Register Final Rules. CMS-published Wage Index Data Wage index data not published in Federal Register Final Rules (such as the wage index data for Renal Dialysis Facilities) were obtained through the CMS website. American Community Survey (2013-2017) We used the American Community Survey (2013-2017) to derive an updated Agency for	

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). Reference Fleming, C., Fisher, E., Chang, C., Bubolz, T., & Malenka, D. (1992). Studying Outcomes and Hospital Utilization in the Elderly: The Advantages of a Merged Data Base for Medicare and Veterans Affairs Hospitals. Medical Care, 30(5), 377-391. Data dictionary attachment Data dictionary attachment	
Level	Facility	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.	N/A	The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization. Additional details are provided in S.5 Numerator Details.
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 pneumonia 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 using Medicare claims and VA administrative data.	N/A	Outcome Definition The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
	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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the pneumonia measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted. Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care. All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
			experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted. The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period. 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
			experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance. For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology. Definition of Emergency Department Visit and Observation Stay We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
Denominator Statement	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	N/A	The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN. The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. 5. Not transferred from another acute care facility.	N/A	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA. 2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital; and, 5. Not transferred from another acute care facility. Cohort codes are included in the attached Data Dictionary.
Exclusions	The 30-day pneumonia (PN) readmission measure excludes index admissions for patients: 1. Discharged against medical advice (AMA); 2. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 3. Admitted within 30 days of a prior index admission for pneumonia.	Excluded Populations: Exclusion Criteria for PN Payment Measure 1. Discharged against medical advice (AMA) Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge 2. Incomplete administrative data in the 30 days following the index admission if discharged alive.	The measure excludes index hospitalizations that meet any of the following exclusion criteria: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS 2. Discharged against medical advice 3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		Rationale: This is necessary in order to identify the outcome (payments) in the sample over our analytic period. 3. Transferred to a federal hospital Rationale: We do not have claims data for these hospitals; therefore, including these patients would systematically underestimate payments. 4. Discharged alive on day of admission or following day and not transferred to another acute care facility. Rationale : This exclusion prevents inclusion of patients who likely did not have clinically significant PN. 5. Not matched to admission in the PN mortality measure Rationale: As part of the current data processing, we match our index PN admissions to the PN mortality cohort to obtain the risk-adjustment variables. Patients are excluded if they cannot be matched between the PN payment and PN mortality cohorts. 6. Missing index DRG weight where provider received no payment Rationale: With neither DRG weight or payment data, we cannot calculate a payment for the patient's index admission; this would make the entire episode of care appear significantly less expensive 7. Patients with inconsistent or unknown vital status or other unreliable demographic data Rationale: Reliable and consistent data are necessary for valid calculation of the measure.	

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		8. Patients enrolled in the Medicare hospice program any time in the 12 months prior to the index admission, including on the first day of the index admission. Rationale: These patients are excluded to align with the 30-Day PN Mortality measure. For patients with more than one eligible admission for an PN in a single year, only one index admission for PN is randomly selected for inclusion in the cohort. Additional admissions within that year are excluded. When index admissions occur during the transition between two years within the measurement period (that is, June/July 2017 or June/July 2018) and both are randomly selected for inclusion in a measure, the measures include only the June admission. July admissions within the 30-day outcome window of the June admission are excluded to avoid assigning payments for the same claims to two admissions.	

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
Exclusion Details	The pneumonia readmission measure excludes index admissions for patients: 1. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Pneumonia admissions within 30 days of discharge from a qualifying pneumonia index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.	For patients with more than one eligible admission for an PN in a single year, only one index admission for PN is randomly selected for inclusion in the cohort. Additional admissions within that year are excluded. When index admissions occur during the transition between two years within the measurement period (that is, June/July 2017 or June/July 2018) and both are randomly selected for inclusion in a measure, the measures include only the June admission. July admissions within the 30-day outcome window of the June admission are excluded to avoid assigning payments for the same claims to two admissions.	The measure excludes index hospitalizations that meet any of the following exclusion criteria: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB). Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted. 2. Discharged against medical advice, identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A. This measure is not stratified.
Type Score	Rate/proportion better quality = lower score	Continuous variable Results of the measure alone do not necessarily reflect the quality of care provided by hospitals but simply whether	Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
		the total episode payments are greater than or less than would be expected for an average hospital with a similar case mix. Hospitals are classified as having a less than average, no different than average, or greater than average payment as compared to national average payment for an episode. Accordingly, a classification of lower than average payment should not be interpreted as better care. The PN risk-standardized payment (RSP) is most meaningful when presented in the context of an PN outcome measure, such as the publicly reported AMI mortality measure. This is because a measure of payments to hospitals that is aligned with a quality measure facilitates profiling hospital value (payments and quality).	
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after	We focused on a 30-day episode of care triggered by admission for an PN as identified using ICD-10 diagnosis codes described in the data dictionary. The measure includes admissions for Medicare FFS beneficiaries aged 65 years and older. A full list of codes used to identify these conditions is provided in the data dictionary. We assigned all payments for the episode of care to the hospital that originally admitted the patient.	The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes. Specifically, CMS calculates EDAC, for each hospital, as the difference (“excess”) between a hospital’s predicted days and expected days per 100 discharges. “Predicted days” is the average number of days a hospital’s patients spent in acute care after adjusting for the risk factors (included in the

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
	adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the		attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges. To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period. The random effects hurdle models are described fully in the original measure methodology report (Horwitz et al., 2016). References: 1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report. https://www.qualitynet.org/inpatient/measures/edac/methodology The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random

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	hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence)		effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes. Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges. To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period. The random effects hurdle models are described fully in the original measure methodology report (Horwitz et al., 2016). References: 1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
	of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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		Pneumonia; Version 1.0. Measure Methodology Report.

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
	the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet. References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.		

Measure	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	2579: Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
Submission items	5.1 Identified measures: 0231 : Pneumonia Mortality Rate (IQI #20) 0279 : Community Acquired Pneumonia Admission Rate (PQI 11) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2579 : Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN) 2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	5.1 Identified measures: 5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value:	5.1 Identified measures: 5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value:

Comparison of NQF #1891, NQF #0275, NQF #0506, and NQF #1789

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Steward	Centers for Medicare & Medicaid Services	Agency for Healthcare Research and Quality	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) is defined as unplanned readmission for any cause within 30 days of the discharge date for	Admissions with a principal diagnosis of chronic obstructive pulmonary disease (COPD) or asthma per 100,000 population, ages 40 years and older. Excludes obstetric admissions and transfers from other institutions. [NOTE: The software provides the rate per population. However, common practice reports the	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	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 and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	measure as per 100,000 population. The user must multiply the rate obtained from the software by 100,000 to report admissions per 100,000 population.]	diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	groups of discharge condition categories or procedure categories: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. The measure also indicates the hospital-level standardized readmission 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 from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				are 65 years or older, are enrolled in Medicare FFS, and are ACO assigned beneficiaries. The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.
Type	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for	While the measure is tested and specified using data from the Healthcare Cost and Utilization Project (HCUP) (see section 1.1 and 1.2 of the measure testing form), the measure specifications and software are specified to be used with any ICD-9-CM- or ICD-10-CM/PCS coded administrative billing/claims/discharge dataset. Available at measure-specific web page URL identified in S.1 Attachment PQI_05_Chronic_Obstructive_Pulmonary_Disease_-COPD-_or_Asthma_in_Older_Adults_Admission_Rate.xlsx	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on	Claims Data sources for the Medicare FFS measure: HWR 1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	all Medicare beneficiaries including dual-eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment		admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare	2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission ACR 1. Medicare Part A claims data for calendar years 2013, 2014, and 2015. 2. Medicare Enrollment Database (EDB). Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	NQF_datadictionary_COPDreadmission_Fall2020_final_7.22.20.xlsx		Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs). References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_PNreadmission_Fall2020_final_7.22.20.xlsx	
Level	Facility	Population : Community, County or City	Facility	Facility
Setting	Inpatient/Hospital	Other: All Community Based Care	Inpatient/Hospital	Inpatient/Hospital, Outpatient Services
Numerator Statement	The outcome for this 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 the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge	Discharges, for patients ages 40 years and older, with either (1) a principal ICD-10-CM diagnosis code for COPD (ACCOPDD*) (excluding acute bronchitis); or (2) a principal ICD-10-CM diagnosis code for asthma (ACSASTD*). Exclude cases (1) with any-listed ICD-10-CM diagnosis codes for cystic fibrosis	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged	The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.	and anomalies of the respiratory system (RESPAN*); (2) transfer from a hospital (different facility); (3) transfer from a Skilled Nursing Facility (SNF) or Intermediate Care Facility (ICF); (4) transfer from another health care facility; (5) with missing gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing), principal diagnosis (DX1=missing), or county (PSTCO=missing).	from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.	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.
Numerator Details	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the	See technical specifications for full list of codes included in numerator.	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of	Outcome definition The measure counts readmissions to any short-term acute care hospital for

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	index COPD 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 using Medicare and VA 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 (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific		the index pneumonia 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 using Medicare claims and VA administrative 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 (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,	any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below. Rationale From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. It is important to note that for the HWR measure, a readmission is included as an index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the COPD measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the pneumonia measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).	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/radiotherapy/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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				Updates and Specifications Report: Hospital-Wide Readmission" Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report. https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841
Denominator Statement	The cohort includes admissions for patients aged 65 or older, who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.9 Denominator Details.	Population ages 40 years and older in metropolitan area or county. Discharges in the numerator are assigned to the denominator based on the metropolitan area or county of the patient residence, not the metropolitan area or county of the hospital where the discharge occurred.	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	The measure 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. ACR-Specific: 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.7 Denominator Details.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of COPD with exacerbation; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	The term "metropolitan area" (MA) was adopted by the U.S. Census in 1990 and referred collectively to metropolitan statistical areas (MSAs), consolidated metropolitan statistical areas (CMSAs), and primary metropolitan statistical areas (PMSAs). In addition, "area" could refer to either 1) FIPS county, 2) modified FIPS county, 3) 1999 OMB Metropolitan Statistical Area, or 4) 2003 OMB Metropolitan Statistical Area. Micropolitan Statistical Areas are not used in the QI software. See AHRQ QI website for 2014 Population File Denominator report for calculation of population estimates embedded within AHRQ QI software programs. http://www.qualityindicators.ahrq.gov/Downloads/Software/SAS/V50/AHRQ_QI_Population_File_V50.pdf	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred from another acute care facility.	To be included in the measure cohort, patients must meet the following inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission; 2. Aged 65 or older; 3. Discharged alive from a non-federal short-term acute care hospital; and 4. Not transferred to another acute care facility. ACR- Specific: An additional criterion for the ACO version of this measure is 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 first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				CCS 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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
Exclusions	The 30-day COPD readmission measures exclude index admissions for patients: 1. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); and, 3. Admitted within 30 days of a prior index admission for COPD.	N/A	The 30-day pneumonia (PN) readmission measure excludes index admissions for patients: 1. Discharged against medical advice (AMA); 2. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 3. Admitted within 30 days of a prior index admission for pneumonia.	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals; 2. Without at least 30 days post-discharge enrollment in Medicare FFS; 3. Discharged against medical advice; 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.
Exclusion Details	1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.	N/A	The pneumonia readmission measure excludes index admissions for patients: 1. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB) Rationale: The 30-day readmission outcome cannot be assessed in this

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	3. COPD admissions within 30 days of discharge from a qualifying COPD index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.		identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Pneumonia admissions within 30 days of discharge from a qualifying pneumonia index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.	group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice; identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				treatment of their cancer remain in the measure.
Risk Adjustment	Statistical risk model	No risk adjustment or risk stratification	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital	Risk adjustment is not currently included in the ICD-10-CM/PCS v7.0 of the AHRQ QI specifications, due to the transition to ICD-10-CM/PCS (October 1, 2015). At least one full year of data coded in ICD-10-CM/PCS is needed in order to develop robust risk adjustment models. A full year of ICD-10-CM/PCS coded all-payer data will not be available until 2018. AHRQ will announce an anticipated date as soon as one is known. The AHRQ QI v7.0 software (SAS and WinQI) for use with ICD-10-CM/PCS produces observed rates, which may be used to evaluate performance within hospitals. However, caution should be used when comparing observed rates across hospitals because observed rates do not account for differences in patient populations (i.e., case mix).	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-	The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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 at the hospital, 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the		specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates	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 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.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account		lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period.	For each specialty cohort, the "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors 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 calculate 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 attributed to a hospital to calculate 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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in		This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet. References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal	the original methodology report (Horwitz et al., 2012). ACR-specific: 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; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period.		distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows	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 hospital 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 at the hospital, 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 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet. References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.		for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected	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 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
			value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet. References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	calculate 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 attributed to a hospital to calculate 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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				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; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.
Submission items	5.1 Identified measures: 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization 0275 : Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	5.1 Identified measures: Yes 5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value:	5.1 Identified measures: 0231 : Pneumonia Mortality Rate (IQI #20) 0279 : Community Acquired Pneumonia Admission Rate (PQI 11) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2579 : Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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)

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
	2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A		2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	following acute myocardial infarction (AMI) hospitalization. 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization 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 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	0275: Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)	0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
				We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A

Comparison of NQF #1891, NQF #1893, NQF #2879, and NQF #2888

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) 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 and are enrolled in fee-for-	The measure estimates a hospital-level 30-day risk-standardized mortality rate (RSMR), defined as death from any cause within 30 days after the index admission date, for patients discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of hospital discharge for any eligible condition. 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. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the	Rate of risk-standardized acute, unplanned hospital admissions among Medicare fee-for-service (FFS) beneficiaries 65 years and older with multiple chronic conditions (MCCs) who are assigned to an Accountable Care Organization (ACO).

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.		discharge date for the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. The target population is Medicare Fee-for-Service (FFS) beneficiaries who are 65 years or older, and hospitalized in non-federal hospitals. This Hybrid HWR measure is a re-engineered version of the HWR measure 1789, the Hospital-Wide All-Cause Unplanned Readmission Measure, which was developed for patients 65 years and older using Medicare claims and is currently publicly reported in the Hospital Inpatient Quality Reporting Program. This reengineered measure uses clinical data elements from patients' electronic health records in addition to claims data for risk adjustment.	
Type	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled	Claims, Electronic Health Data Data sources for the Medicare FFS measure: 1. Medicare Part A inpatient claims: This data source contains claims data for FFS inpatient services including: Medicare inpatient hospital care	Claims, Enrollment Data, Other Medicare administrative claims and enrollment data from calendar years 2017 and 2018, 2013-2017 American Community Survey, and 2017-2018 Area Health Resource File. No data collection instrument provided Attachment

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual-eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months	nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part	as well as inpatient physician claims for the 12 months prior to and including the index admission. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission. 3. Patients' electronic health records: The clinical data elements used in the risk models for this measure will be derived from patients EHRs. The measure was developed and tested using data from EHRs. No data collection instrument provided Attachment NQF_2879_Hybrid_HWR_NQF_Data_Dictionary_v1.0_final_12-20-18-637387160536406094.xlsx	NQF_ACO_MCC_DataDictionary_07.09.20.xlsx

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_COPDreadmission_Fall2020_final_7.22.20.xlsx	B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score. References: Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_COPDmortality_Fall2020_final_7.22.20.xlsx		
Level	Facility	Facility	Facility	Other
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Outpatient Services
Numerator Statement	The outcome for this measure is 30-day readmission. We define readmission as an inpatient	The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days	The outcome for this measure is 30-day readmission. We define readmission as an inpatient	The outcome for this measure is the number of acute unplanned hospital admissions per 100 person-years at

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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.	from the date of admission for patients hospitalized with either a principal diagnosis of COPD or a principal diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD.	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.	risk for admission during the measurement period.
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 COPD	The measure counts all deaths (including in-hospital deaths) for any	Outcome definition The measure counts readmissions to any acute care hospital for any cause	Outcome Definition The outcome for this measure is the number of acute, unplanned hospital

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	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 using Medicare and VA 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 (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.	cause within 30 days of the date of the index COPD admission. Identifying deaths in the FFS measure As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.	within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below. Rationale Planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. 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	admissions per 100 person-years at risk for admission during the measurement period. Time Period Number of admissions are counted while the patient is considered at risk for an admission during the measurement year. Excluded Admissions The numerator (outcome) does not include the following admissions because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of MCC patients: 1. Planned hospital admissions; 2. Admissions that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility; 3. Admissions that occur within a 10-day “buffer period” of time after discharge from a hospital, SNF, or acute rehabilitation facility; 4. Admissions that occur after the patient has entered hospice; 5. Admissions related to complications of procedures or surgeries; 6. Admissions related to accidents or injuries; or

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the COPD measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).		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/radiotherapy/ 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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see the report titled "2018 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0" Simoes J, Grady J, Purvis D, et al. 2018 All-Cause Hospital Wide Measure Updates and Specifications Report. Accessed November 6, 2018.	7. Admissions that occur prior to the first visit with the assigned clinician or clinician group. Clarification regarding the 10-day "buffer period" The 10-day "buffer period" is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				Identification of planned admissions To identify planned admissions, the measure adopted an algorithm previously developed for CMS's hospital readmission measures, CMS's Planned Readmission Algorithm Version 4.0. [1,2] In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip replacement or cholecystectomy). Admissions for an acute illness are never considered planned. For specific codes included in the planned admission algorithm, please see Tables PAA1-PAA4 with the codes for the CMS Planned Admission Algorithm in the accompanying data dictionary. Identification of admissions that occur directly from a SNF or acute rehabilitation facility

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				Claims for SNF and acute rehabilitation facility stays, which help determine the outcome definition, were obtained using CMS's Integrated Data Repository (IDR). Identification of admissions that occur after the patient has entered hospice The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for the measurement year and the year prior were obtained from the CMS Medicare Enrollment Database. Identification of admissions related to complications of procedures or surgeries (including small bowel obstruction), and accidents or injuries Using the Agency for Healthcare Research and Quality's (AHRQ's) Clinical Classifications Software (CCS), which clusters diagnoses into clinically meaningful categories using International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, we exclude from the outcome admissions related to the following 23 CCS categories. For specific ICD codes included, please refer to

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				AHRQ's CCS Version 2019.1, Fiscal Year 2020. a. Complications of procedures or surgeries 1. 145: Intestinal obstruction without hernia 2. 237: Complication of device; implant or graft 3. 238: Complications of surgical procedures or medical care 4. 257: Other aftercare b. Accidents or injuries 5. 2601 E Codes: Cut/pierce 6. 2602 E Codes: Drowning/submersion 7. 2604 E Codes: Fire/burn 8. 2605 E Codes: Firearm 9. 2606 E Codes: Machinery 10. 2607 E Codes: Motor vehicle traffic (MVT) 11. 2608 E Codes: Pedal cyclist; not MVT 12. 2609 E Codes: Pedestrian; not MVT 13. 2610 E Codes: Transport; not MVT 14. 2611 E Codes: Natural/environment 15. 2612 E Codes: Overexertion 16. 2613 E Codes: Poisoning

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				17. 2614 E Codes: Struck by; against 18. 2615 E Codes: Suffocation 19. 2616 E Codes: Adverse effects of medical care 20. 2618 E Codes: Other specified and classifiable 21. 2619 E Codes: Other specified; NEC 22. 2620 E Codes: Unspecified 23. 2621 E Codes: Place of occurrence Citations 1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018. 2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Denominator Statement	The cohort includes admissions for patients aged 65 or older, who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.9 Denominator Details.	This claims-based measure is used for a cohort of patients aged 65 years or older. The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of COPD and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details.	The measure 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. Additional details are provided in S.7 Denominator Details.	Patients included in the measure (target patient population) The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with multiple chronic conditions (MCCs). Attribution: The outcome is attributed to the ACO to which the patient is assigned. (More details are provided in the next section.) Person-time at risk Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of COPD or principal discharge	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with	To be included in the measure cohort, patients must meet the following additional inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the	Patients included in the measure (target patient population) The cohort, or group of patients included in the measure, is comprised of patients whose combinations of chronic conditions

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	diagnosis of respiratory failure with a secondary discharge diagnosis of COPD with exacerbation; 2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. 5. Not transferred to another acute care facility.	a secondary discharge diagnosis of acute exacerbation of COPD 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries 3. Aged 65 or over 4. Not transferred from another acute care facility. This measure can also be used for an all-payer population aged 40 years and older. We have explicitly tested the measure in both patients aged 40+ years and those aged 65+ years (see Testing Attachment for details).	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 measure first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) 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 CCS 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.	put them at high risk of admission and whose admission rates could be lowered through better care. This definition reflects NQF's "Multiple Chronic Conditions Measurement Framework," which defines patients with MCCs as people "having two or more concurrent chronic conditions that … act together to significantly increase the complexity of management, and affect functional roles and health outcomes, compromise life expectancy, or hinder self-management." [1] The specific inclusion criteria are as follows: 1. Patient is alive at the start of the measurement period and has two or more of nine chronic condition disease groups in the year prior to the measurement period. Chronic conditions, except for diabetes, are defined using CMS's Chronic Conditions Data Warehouse (CCW). For diabetes, we used the diabetes cohort definition from the Accountable Care Organization (ACO) diabetes admission measure developed by CORE (v2018a ACO-36) as opposed to the definition used in CCW, which includes diagnoses for secondary and drug-induced diabetic

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
			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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts are attached in the data dictionary.	conditions that are not the focus of the MIPS MCC admission measure. See Table 1 in the accompanying data dictionary for the specific codes used to define the nine cohort-qualifying conditions. 1. Acute myocardial infarction (AMI), 2. Alzheimer's disease and related disorders or senile dementia, 3. Atrial fibrillation, 4. Chronic kidney disease (CKD), 5. Chronic obstructive pulmonary disease (COPD) or asthma, 6. Depression, 7. Diabetes, 8. Heart failure, and 9. Stroke or transient ischemic attack (TIA). Rationale: As noted above, this definition of MCCs is consistent with NQF's "Multiple Chronic Conditions Measurement Framework" and except for diabetes, is the same as the original ACO MCC measure [2]. Diabetes was added as a cohort-qualifying condition based on input from our TEP for the MIPS version of this measure, and further guidance from CMS. The inclusion of diabetes acknowledges the complexity that

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				diabetes introduces to caring for patients with MCCs. 2. Patient is aged =65 years at the start of the year prior to the measurement period. Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult. 3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period. Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment. 4. Patient is attributed to a Medicare Shared Savings Program ACO. Rationale: This measure is designed for ACOs that are part of MSSP and thus includes patients with MCCs who are attributed to one of the MSSP ACOs. The outcome is attributed to the ACO to which the patient is assigned. Patients are assigned to ACOs according to the

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
				specific ACO program assignment algorithm. This measure is limited to ACOs that are part of the Medicare Shared Savings Program (MSSP)where patients are retrospectively assigned to an ACO if they obtained the plurality of their primary care through the ACO's providers during the measurement year. Information on ACO beneficiary assignment is here. Citations 1. National Quality Forum. Multiple Chronic Conditions Measurement Framework. Accessed February 20, 2019. 2. Drye EE, Altaf FK, Lipska KJ et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018; 56(2):193-201.

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Exclusions	The 30-day COPD readmission measures exclude index admissions for patients: 1. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); and, 3. Admitted within 30 days of a prior index admission for COPD.	The mortality measures exclude index admissions for patients: 1. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data; 2. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission; or 3. Discharged against medical advice (AMA). For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort for each year.	The Hybrid HWR 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 Medicare FFS; 3. Discharged against medical advice (AMA); 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. Admitted for medical treatment of cancer.	The measure excludes the following patients: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. 2. Patient enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year. 3. Patients without any visits with any of the TINs associated with the attributed ACO during the measurement year or the year prior to the measurement year. 4. Patients not at risk for hospitalization during the measurement year.
Exclusion Details	• Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.	1. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years: 2) if the discharge date for a hospitalization is before the admission date; 3) if the patient has a sex other than 'male' or 'female'. Rationale: Reliable and consistent data are necessary for valid calculation of the measure. 2. Hospice enrollment in the 12 months prior to or on the index	The Hybrid HWR measure excludes index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS Rationale: The 30-day readmission outcome cannot be assessed in this	The rationale for each exclusion is provided below: 1. Patients without continuous enrollment in Medicare Part A or B during the measurement period. Rationale: The measure excludes these patients to ensure full data availability for outcome assessment and attribution. 2. Patients enrolled in hospice during the year prior to the

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	• Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. • COPD admissions within 30 days of discharge from a qualifying COPD index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.	admission is identified using hospice data. Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care. 3. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.	group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical	measurement year or at the start of the measurement year. Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, it may be difficult to influence end-of-life care once a patient is enrolled in hospice and served by a hospice team. 3. Patients without any visits (Evaluation & Management [E&M] or other) with any of the TINs associated with the attributed ACO during the measurement year and the year prior to the measurement year. Rationale: These patients are excluded because the start of their time-at-risk cannot be ascertained. 4. Patients not at risk for hospitalization at any time during the measurement year. Rationale: The outcomes for these patients cannot be assessed as they are not at risk. For example, if the first visit to the attributed ACO occurred after the patient has entered hospice, the patient would not have any time at risk and would thus be excluded. See section 2.4.3 of the attached MIPS MCC technical

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
			treatment of their cancer remain in the measure.	report for methods used to calculate person-time at risk. Clarification of 10-day buffer period: The 10-day "buffer period" is a numerator (or outcome) exclusion (see section S.5) but it also affects the denominator (person-time at risk). Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital during the measurement period. In addition to time spent in the hospital, we also exclude from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care. Note that the patient is not removed from the denominator, we are just subtracting the 10-days of person-time. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable

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				for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS's Transitional Care Management (TCM) service guidelines and for the ambulatory care provider's care plan to take effect. CMS's TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	Not applicable. This measure is not stratified.
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected	The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level,	The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital readmission within 30 days of discharge using age, selected clinical covariates, and a hospital-specific effect. At the	We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of	it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix.	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 at the hospital, 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 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.	model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected

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	statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To	Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described	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 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	admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation. We begin by identifying the cohort of MCC patients by applying the inclusion/exclusion criteria. We use MSSP ACO assignment to identify MCC patients attributed to MSSP ACOs. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our measure specifications. The measure is risk-adjusted for demographic, clinical, and social risk factors. For the score calculation, the measure uses a hierarchical (two-level) statistical

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	assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index	fully in the original methodology report posted on QualityNet References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for COPD 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 and Shahian, 2007). At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same	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). References: Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012; Accessed August 3, 2018. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the approach simultaneously models	model that accounts for the clustering of patients within ACOs and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for MCC patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to ACOs. Therefore, the "expected" number of admissions (described below) for each ACO is based on the performance of all ACOs in the MSSP program, nationwide. The second level of the model estimates a random-intercept term that reflects the ACO's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size. The measure score is a risk-standardized acute admission rate (RSAAR), calculated as the ratio of the number of predicted admissions to the number of expected

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	admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed"	hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the	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 hospital 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 at the hospital, 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 SRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at a given hospital. For	admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MSSP ACOs. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. We multiply the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned admissions among all MSSP ACOs – for ease of interpretation.

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	to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the	risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	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 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	

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	hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.		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). References: Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final	

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
			Technical Report. 2012; Accessed August 3, 2018. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	
Submission items	5.1 Identified measures: 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization 0275 : Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	5.1 Identified measures: 0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization 0275 : Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure 3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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 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)	5.1 Identified measures: 3597 : Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System (MIPS MCC measure): The measure specifications are harmonized to the fullest extent possible. The only differences are for the CMS programs and measurement levels for which they are intended: for example, the MIPS measure is attributed and scored for clinician groups under MIPS, and the ACO MCC admission measure is

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
	5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: We did not include in our list of related measures any non-outcome measures, such as process measures, with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example,	attributed and scored for Medicare ACOs. Hospitalizations for Ambulatory Care Sensitive Conditions for Dual-Eligible Beneficiaries Unlike this updated measure which is specified for evaluating ACOs, the ACSC DE measure is a state-level measure. The cohorts, outcomes, and the risk-adjustment models differ accounting for differences in their target populations and measurement settings. -Cohort: Unlike the ACO MCC measure which targets patients with two or more of eight chronic conditions age >65 years, the ACSC DE measure targets dual-eligible adults age >18 years within each state; it does not focus on patients with certain chronic conditions. -Outcome: Unlike the ACO MCC measure which targets unplanned admissions, the ACSC DE measure is a composite of ACSC admissions. The ACSC DE measure outcome is ACSC admissions per 1,000 beneficiaries for ACSC by chronic, acute, and both conditions -Risk adjustment: Like the ACO MCC measure, the ACSC DE measure is risk-adjusted. Both measures adjust for patient demographics and comorbidities defined by Condition Categories (CCs). Specifically, the ACSC measure

Measure	1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	1893: Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization	2879e: Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data	2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
			patients who receive a specific medication or undergo a specific procedure). The proposed Hybrid HWR measure is a reengineered version of the HWR measure (NQF #1789) in that the proposed measure uses clinical data elements collected from EHR in addition to claims data for risk adjustment. The measure listed above uses only claims data for risk adjustment. In order for CMS to implement this measure in HIQR, there must be a requirement for IPPS hospitals to submit the clinical data elements required for measure calculation. This requirement is not yet in place and there is no current timetable for implementation. However, once the CCDE are collected, this Hybrid measure may replace the claims-only measure.	adjusts for age and sex, comorbidities, condition interactions, disability-by-condition interactions, and the total number of conditions. 5b.1 If competing, why superior or rationale for additive value: N/A

Comparison of NQF #2515, NQF #0114, NQF #0115, NQF #0119 and NQF #0129

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
Steward	Centers for Medicare & Medicaid Services	The Society of Thoracic Surgeons	The Society of Thoracic Surgeons	The Society of Thoracic Surgeons	The Society of Thoracic Surgeons
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older. An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.	Percent of patients aged 18 years and older undergoing isolated CABG (without pre-existing renal failure) who develop postoperative renal failure or require dialysis	Percent of patients aged 18 years and older undergoing isolated CABG who require a re-intervention during the current hospitalization for mediastinal bleeding with or without tamponade, graft occlusion, valve dysfunction, or other cardiac reason	Percent of patients aged 18 years and older undergoing isolated CABG who die, including both 1) all deaths occurring during the hospitalization in which the CABG was performed, even if after 30 days, and 2) those deaths occurring after discharge from the hospital, but within 30 days of the procedure	Percent of patients aged 18 years and older undergoing isolated CABG who require intubation for more than 24 hours postoperatively
Type	Outcome	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient	Registry Data STS Adult Cardiac Surgery Database Version 2.81 (effective July 1, 2014); Version 2.9 (effective July 1, 2017)	Registry Data STS Adult Cardiac Surgery Database Version 2.81 (effective July 1, 2014); Version 2.9 (effective July 1, 2017)	Registry Data STS Adult Cardiac Surgery Database Version 2.81 (effective July 1, 2014); Version 2.9 (effective July 1, 2017)	Registry Data STS Adult Cardiac Surgery Database Version 2.81 (effective July 1, 2014); Version 2.9 (effective July 1, 2017)

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all	Available at measure-specific web page URL identified in S.1 Attachment S.15._Isolated_CABG_Risk_Model_Specifications.docx	Available at measure-specific web page URL identified in S.1 Attachment S.15._Isolated_CABG_Risk_Model_Specifications-636220002799399548.docx	Available at measure-specific web page URL identified in S.1 Attachment S.15._Isolated_CABG_Risk_Model_Specifications-635307506255634552.doc	Available at measure-specific web page URL identified in S.1 Attachment S.15._Isolated_CABG_Risk_Model_Specifications.doc

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_CABGreadmission_Fall2020_final_7.22.20.xlsx				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
Level	Facility	Facility, Clinician : Group/Practice	Facility, Clinician : Group/Practice	Facility, Clinician : Group/Practice	Facility, Clinician : Group/Practice
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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	Number of patients undergoing isolated CABG who develop postoperative renal failure or require dialysis	Number of patients undergoing isolated CABG who require a re-intervention during the current hospitalization for mediastinal bleeding with or without tamponade, graft occlusion, valve dysfunction, or other cardiac reason	Number of patients undergoing isolated CABG who die, including both 1) all deaths occurring during the hospitalization in which the operation was performed, even if after 30 days, and 2) those deaths occurring after discharge from the hospital, but within 30 days of the procedure	Number of patients undergoing isolated CABG who require intubation > 24 hours following exit from the operating room

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	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.				
Numerator Details	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge after undergoing isolated CABG surgery, excluding planned readmissions as defined below. Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure. Planned Readmission Algorithm (Version 4.0)	Definition of renal failure/dialysis requirement – Patients with acute renal failure or worsening renal function resulting in one or both of the following: - Increase of serum creatinine to 4.0 or higher, or 3x the most recent preoperative creatinine level - New requirement for dialysis postoperatively Number of isolated CABG procedures in which postoperative renal failure [CRenFail (STS Adult Cardiac Surgery Database Version 2.9)] is marked as "yes"	Number of isolated CABG procedures in which any of the following are marked "yes" – ReOp for Bleeding [COpReBld (STS Adult Cardiac Surgery Database Version 2.73)], Reintervention for Graft Occlusion (COpReGft), ReOp for Valve Dysfunction (COpReVlv), ReOp for Other Cardiac Reason (COpReOth)	Number of isolated CABG procedures with an operative mortality; Number of isolated CABG procedures in which Mortality [Mortalty (STS Adult Cardiac Surgery Database Version 2.9)] and Mortality Operative Death (MtOpD) are marked “yes.” Operative mortality is further verified by the following variables: Mortality Status at 30 days (Mt30Stat), Mortality Date (MtDate), Mortality Discharge Status (MtDCStat)	Number of isolated CABG procedures in which Prolonged Ventilation (CPVntLng) is marked "yes" (STS Adult Cardiac Surgery Database Version 2.9) The hours of postoperative ventilation time include OR exit until extubation, plus any additional hours following reintubation.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. In brief, the algorithm identifies a short list of always planned readmissions (those where the principal discharge diagnosis is major organ transplant, obstetrical delivery, or maintenance chemotherapy) as well as those readmissions with a potentially planned procedure (e.g., total hip replacement) AND a non-acute principle discharge diagnosis code. For example, a readmission for colon resection is considered planned if the principal diagnosis is colon cancer but unplanned if the principal diagnosis is abdominal pain, as this might represent a complication of the CABG				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	procedure or hospitalization. Readmissions that included potentially planned procedures with an acute principal diagnosis or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are not excluded from the measure outcome as they are considered unplanned in this measure. The planned readmission algorithm has three fundamental principles: 1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation); 2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the CABG measure with modifications. The planned readmission algorithm and associated code tables are attached in				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	data field S.2b (Data Dictionary or Code Table). It should be noted that this approach differs from that adopted by STS for their registry-based measure, in which all 30-day readmissions were considered to be unplanned. Outcome Attribution Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows: • If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the readmission outcome				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates readmission risk even among transferred patients. • If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the readmission outcome is attributed to the second hospital performing the index CABG procedure and the 30-day window				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	starts with the date of discharge from the final hospital in the chain. Rationale: Care provided by the hospital performing the CABG procedure likely dominates readmission risk. • If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the readmission outcome is attributed to the first hospital performing the index (first) CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	readmission risk even among transferred patients.				
Denominator Statement	The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.	All patients undergoing isolated CABG	All patients undergoing isolated CABG	All patients undergoing isolated CABG	All patients undergoing isolated CABG
Denominator Details	In order to create a clinically coherent population for risk adjustment, and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures).	Number of isolated CABG procedures including re-operations; the SQL code used to create the function to identify cardiac procedures is provided in the appendix.	Number of isolated CABG procedures. The SQL code used to create the function used to identify cardiac procedures is provided in the Appendix.	Number of isolated CABG procedures. The SQL code used to create the function to identify cardiac procedures is provided in the appendix.	Number of isolated CABG procedures. The SQL code used to create the function to identify cardiac procedures is provided in the appendix.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
Exclusions	For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions: 1. Without at least 30 days post-discharge enrollment in FFS Medicare 2. Discharged against medical advice (AMA) 3. Admissions for subsequent qualifying CABG procedures during the measurement period	Patients with documented history of renal failure, baseline serum creatinine of 4.0 or higher; prior renal transplants are not considered preoperative renal failure unless since transplantation their Cr has been or is 4.0 or higher	N/A	N/A	N/A
Exclusion Details	The CABG readmission measure excludes hospitalizations if they meet any of the following criteria: 1. Without at least 30 days post-discharge enrollment in FFS Medicare Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.	(Dialysis) is marked yes; Last Creatinine Level (CreatLst) is 4.0 or higher	N/A	N/A	N/A

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Admissions for subsequent qualifying CABG procedures during the measurement period. Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	and exclude subsequent CABG surgery admissions from the cohort.				
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	N/A	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the	Please refer to numerator and denominator sections for detailed information. Please refer to numerator and denominator sections for detailed information.	Please refer to numerator and denominator sections for detailed information. Please refer to numerator and denominator sections for detailed information.	Please refer to numerator and denominator sections for detailed information. Please refer to numerator and denominator sections for detailed information.	Please refer to numerator and denominator sections for detailed information. Please refer to numerator and denominator sections for detailed information.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	regression models are described fully in the original methodology report posted on QualityNet References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission.				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate.				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.				
Submission items	5.1 Identified measures: 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. 0119 : Risk-Adjusted Operative Mortality for CABG 0115 : Risk-Adjusted Surgical Re-exploration 0114 : Risk-Adjusted Postoperative Renal Failure	5.1 Identified measures: 0115 : Risk-Adjusted Surgical Re-exploration 0116 : Anti-Platelet Medication at Discharge 0117 : Beta Blockade at Discharge 0118 : Anti-Lipid Treatment Discharge 0127 : Preoperative Beta Blockade 0119 : Risk-Adjusted Operative Mortality for CABG 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 0130 : Risk-Adjusted Deep Sternal Wound Infection	5.1 Identified measures: 0114 : Risk-Adjusted Postoperative Renal Failure 0116 : Anti-Platelet Medication at Discharge 0117 : Beta Blockade at Discharge 0118 : Anti-Lipid Treatment Discharge 0119 : Risk-Adjusted Operative Mortality for CABG 0127 : Preoperative Beta Blockade 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 0130 : Risk-Adjusted Deep Sternal Wound Infection	5.1 Identified measures: 0114 : Risk-Adjusted Postoperative Renal Failure 0115 : Risk-Adjusted Surgical Re-exploration 0116 : Anti-Platelet Medication at Discharge 0117 : Beta Blockade at Discharge 0118 : Anti-Lipid Treatment Discharge 0120 : Risk-Adjusted Operative Mortality for Aortic Valve Replacement (AVR) 0127 : Preoperative Beta Blockade	5.1 Identified measures: 0114 : Risk-Adjusted Postoperative Renal Failure 0115 : Risk-Adjusted Surgical Re-exploration 0116 : Anti-Platelet Medication at Discharge 0117 : Beta Blockade at Discharge 0118 : Anti-Lipid Treatment Discharge 0119 : Risk-Adjusted Operative Mortality for CABG 0127 : Preoperative Beta Blockade 0130 : Risk-Adjusted Deep Sternal Wound Infection

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0130 : Risk-Adjusted Deep Sternal Wound Infection 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2558 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery 3494 : Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: The CABG	0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0134 : Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG) 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: N/A	0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0134 : Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG) 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: N/A	0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 0130 : Risk-Adjusted Deep Sternal Wound Infection 0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0134 : Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG) 0123 : Risk-Adjusted Operative Mortality for Aortic Valve Replacement (AVR) + CABG Surgery 0121 : Risk-Adjusted Operative Mortality for Mitral Valve (MV) Replacement 0122 : Risk-Adjusted Operative Mortality for Mitral Valve (MV) Replacement + CABG Surgery 1501 : Risk-Adjusted Operative Mortality for Mitral Valve (MV) Repair 1502 : Risk-Adjusted Operative Mortality for	0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0134 : Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG) 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: N/A

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	readmission measure, which was developed in close collaboration with STS, has a target population (i.e., isolated CABG patients) that is harmonized with the above measures to the extent possible given the differences between clinical and administrative data. The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial MAZE procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to differentiate them from open maze procedures. The age range for the proposed CABG readmission and existing NQF-endorsed STS measure cohorts differs; STS measures are specified for age 18 and over, and the CABG readmission measure is currently			Mitral Valve (MV) Repair + CABG Surgery 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value: N/A	

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	specified for age 65 and over. The proposed CABG readmission measure is harmonized with the above measures to the extent possible given the different data sources used for development and reporting. 5b.1 If competing, why superior or rationale for additive value: This measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for coronary artery bypass graft (CABG)). The measure steward for the registry-based readmission measure for CABG is also CMS; STS developed the measure. Effort was taken to harmonize both the registry-based and administrative-based measures to the extent possible given the differences in data sources.				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	CMS developed these two "competing" measures at the same time to allow for maximum flexibility in implementation for quality improvement programs across different care settings. The STS cardiac surgery registry currently enrolls most, but not all, patients receiving CABG surgeries in the U.S. The proposed CABG readmission measure will capture all qualifying Medicare FFS patients undergoing CABG regardless of whether their hospital or surgeon participates in the STS registry. This claims-based CABG readmission measure was developed with the goal of producing a measure with the highest scientific rigor and broadest applicability. The measure is harmonized with the above existing and proposed measures to the extent possible given the different data sources used				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0114: Risk-Adjusted Postoperative Renal Failure	0115: Risk-Adjusted Surgical Re-exploration	0119: Risk-Adjusted Operative Mortality for CABG	0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)
	for development and reporting.				

Comparison of NQF #2515, NQF #0130, NQF #0131, NQF #0330 and NQF #0505

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
Steward	Centers for Medicare & Medicaid Services	The Society of Thoracic Surgeons	The Society of Thoracic Surgeons	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for	Percent of patients aged 18 years and older undergoing isolated CABG for whom mediastinitis or deep sternal wound infection is diagnosed	Percent of patients aged 18 years and older undergoing isolated CABG who have a postoperative stroke (i.e.,	The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal	The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older. An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.	within 30 days postoperatively or at any time during the hospitalization for surgery	any confirmed neurological deficit of abrupt onset caused by a disturbance in blood supply to the brain) that did not resolve within 24 hours	diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.	discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.
Type	Outcome	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare	Registry Data STS Adult Cardiac Surgery Database Version 2.81 (effective July 1, 2014); Version 2.9 (effective July 1, 2017) Available at measure-specific web page URL identified in S.1 Attachment S.15._Isolated_CABG_Risk_Model_Specifications-	Registry Data STS Adult Cardiac Surgery Database Version 2.81 (effective July 1, 2014); Version 2.9 (effective July 1, 2017) Available at measure-specific web page URL identified in S.1 Attachment	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital	Claims, Enrollment Data, Other Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.	635570255313893234-636220007682323593-636511009556464790.docx	S.15._Isolated_CABG_Risk_Model_Specifications-635307594428525960.docx	care, outpatient hospital services, and inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient	hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. Veterans Health Administration (VA) Data:

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_CABGreadmission_Fall2020_final_7.22.20.xlsx			services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare	This data source contains administrative data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
				and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_HFreadmission_Fall2020_final_7.22.20.xlsx	Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_AMIreadmission_Fall2020_final_7.22.20.xlsx
Level	Facility	Facility, Clinician : Group/Practice	Facility, Clinician : Group/Practice	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital	Inpatient/Hospital
Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days	Number of patients aged 18 years and older undergoing isolated CABG for whom mediastinitis or deep sternal wound infection is diagnosed within 30 days postoperatively or at any time during the hospitalization for surgery	Number of patients undergoing isolated CABG who have a postoperative stroke (i.e., any confirmed neurological deficit of abrupt onset caused by a disturbance in blood supply to the brain) that did not resolve within 24 hours	The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. 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	The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	after discharge from the index admission, only the first 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.			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. Additional details are provided in S.5 Numerator Details.	after discharge from the index admission, only the first 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. Additional details are provided in S.5 Numerator Details.
Numerator Details	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge after undergoing isolated CABG surgery, excluding planned readmissions as defined	Numerator time period: Within 30 days postoperatively or at any time during the hospitalization for surgery Number of isolated CABG procedures in which deep sternal infection/mediastinitis [DeepSternInf (STS Adult	Number of isolated CABG procedures in which postoperative stroke [CNStrokP (STS Adult Cardiac Surgery Database Version 2.9)] is marked "yes"	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index HF admission, excluding planned readmissions as defined below.	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index AMI admission, excluding planned readmissions as defined below.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	below. Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure. Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. In brief, the algorithm identifies a short list of always planned readmissions (those where the principal discharge diagnosis is major organ transplant, obstetrical	Cardiac Surgery Database Version 2.9)] is marked "yes" DeepSternInf Deep incisional SSI: Must meet the following criteria 4. Infection occurs within 30 days after the operative procedure, and involves deep soft tissues of the incision (e.g., fascial and muscle layers) and patient has at least one of the following: 5. Purulent drainage from the deep incision. 6. A deep incision that spontaneously dehisces or is deliberately opened by a surgeon, attending physician or other designee and is culture-positive or not cultured, and patient has at least one of the following signs or symptoms: ○ Fever (>38°C) ○ Localized pain or tenderness ○ An abscess or other evidence of infection involving		Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative 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/radiotherapy/ 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.	Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA 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 (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

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	delivery, or maintenance chemotherapy) as well as those readmissions with a potentially planned procedure (e.g., total hip replacement) AND a non-acute principle discharge diagnosis code. For example, a readmission for colon resection is considered planned if the principal diagnosis is colon cancer but unplanned if the principal diagnosis is abdominal pain, as this might represent a complication of the CABG procedure or hospitalization. Readmissions that included potentially planned procedures with an acute principal diagnosis or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are not excluded from the measure outcome as they are considered unplanned in this measure.	the deep incision that is detected on direct examination, during invasive procedure, or by histopathologic examination or imaging test. ○ A culture with negative findings does not meet this criterion. 2. There are two specific types of deep incisional SSIs: ○ Deep Incisional Primary (DIP) – a deep incisional SSI that is identified in a primary incision in a patient that has had an operation with one or more incisions (e.g., chest incision for CABG) ○ Deep Incisional Secondary (DIS) – a deep incisional SSI that is identified in the secondary incision in a		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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).	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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

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	The planned readmission algorithm has three fundamental principles: 1. A few specific, limited types of care are always considered planned (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed	patient that has had an operation with more than one incision (e.g., donor site incision for CABG) MED-Mediastinitis: Must meet the following criteria • Mediastinitis must meet at least 1 of the following criteria: ○ Patient has organisms cultured from mediastinal tissue or fluid obtained during an invasive procedure. ○ Patient has evidence of mediastinitis seen during an invasive procedure or histopathologic examination. ○ Patient has at least 1 of the following signs or symptoms: ▪ Fever (>38°C) ▪ Chest pain (with			

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	the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the CABG measure with modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table). It should be noted that this approach differs from that adopted by STS for their registry-based measure, in which all 30-day readmissions were considered to be unplanned. Outcome Attribution Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves	no other recognized cause) ○ Sternal instability (with no other recognized cause) and at least 1 of the following: ▪ Purulent discharge from mediastinal area ▪ Organisms cultured from blood or discharge from mediastinal area ○ Mediastinal widening on imaging test.			

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	an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows: - If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the readmission outcome is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates readmission risk even among transferred patients.				

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	2. If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the readmission outcome is attributed to the second hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: Care provided by the hospital performing the CABG procedure likely dominates readmission risk. 3. If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the readmission outcome is attributed to the first				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	hospital performing the index (first) CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates readmission risk even among transferred patients.				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
Denominator Statement	The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.	All patients undergoing isolated CABG	All patients undergoing isolated CABG	The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively. Additional details are provided in S.7 Denominator Details	The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission. Additional details are provided in S.7 Denominator Details.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
Denominator Details	In order to create a clinically coherent population for risk adjustment, and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures).	Number of isolated CABG procedures. The SQL code used to create the function used to identify cardiac procedures is provided in the Appendix.	Number of isolated CABG procedures. The SQL code used to create the function to identify cardiac procedures is provided in the appendix.	To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria: 1. Principal discharge diagnosis of HF; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of AMI; 2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries; 3. Aged 65 or over; 4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and, 5. Not transferred to another acute care facility.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
Exclusions	For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions: 1. Without at least 30 days post-discharge enrollment in FFS Medicare 2. Discharged against medical advice (AMA) 3. Admissions for subsequent qualifying CABG procedures during the measurement period	N/A	N/A	The 30-day HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Admitted within 30 days of a prior index admission for HF; and 4. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.	The 30-day AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries); 2. Discharged against medical advice (AMA); 3. Same-day discharges; or 4. Admitted within 30 days of a prior index admission for AMI.
Exclusion Details	The CABG readmission measure excludes hospitalizations if they meet any of the following criteria: 1. Without at least 30 days post-discharge enrollment in FFS Medicare Rationale: The 30-day readmission outcome	N/A	N/A	The HF readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the	The AMI readmission measure excludes index admissions for patients: 1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Admissions for subsequent qualifying CABG procedures during the measurement period. Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher			Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified by comparing the discharge date from the index admission with subsequent admission dates. Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an	the Medicare Enrollment Database. Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Same-day discharges. This information is identified in claims data. Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs. 4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing

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	risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.			index admission and a readmission for another index admission. 4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be found in attached Data Dictionary). Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.	the discharge date from the index admission with subsequent admission dates. Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	N/A	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery using	Please refer to numerator and denominator sections for detailed information. Please refer to numerator and	Please refer to numerator and denominator sections for detailed information. Please refer to numerator and	The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF using hierarchical logistic regression models. In	The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI using hierarchical logistic

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after	denominator sections for detailed information.	denominator sections for detailed information.	brief, the approach simultaneously models data at the patient- and hospital-levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of	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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

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	adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's			"predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality.	The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-

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	performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is			The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period.	than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-

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	added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet: (https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The			This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient- and hospital-levels to account for variance in	estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI 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 and Shahian,

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for			patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted	2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses.			readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and	hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of			the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 intercept using all hospitals in our sample is added in place of the hospital specific intercept. 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate.	specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet: (https://qualitynet.org/inpatient/measures/readmission/methodology). References:			The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005.	The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet References Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.				
Submission items	5.1 Identified measures: 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. 0119 : Risk-Adjusted Operative Mortality for CABG 0115 : Risk-Adjusted Surgical Re-exploration 0114 : Risk-Adjusted Postoperative Renal Failure 0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0130 : Risk-Adjusted Deep Sternal Wound Infection	5.1 Identified measures: 0114 : Risk-Adjusted Postoperative Renal Failure 0115 : Risk-Adjusted Surgical Re-exploration 0116 : Anti-Platelet Medication at Discharge 0117 : Beta Blockade at Discharge 0118 : Anti-Lipid Treatment Discharge 0119 : Risk-Adjusted Operative Mortality for CABG 0127 : Preoperative Beta Blockade 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0134 : Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG)	5.1 Identified measures: 0114 : Risk-Adjusted Postoperative Renal Failure 0115 : Risk-Adjusted Surgical Re-exploration 0116 : Anti-Platelet Medication at Discharge 0117 : Beta Blockade at Discharge 0118 : Anti-Lipid Treatment Discharge 0119 : Risk-Adjusted Operative Mortality for CABG 0127 : Preoperative Beta Blockade 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 0130 : Risk-Adjusted Deep Sternal Wound Infection 0134 : Use of Internal Mammary Artery (IMA) in	5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. 0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2880 : Excess days in acute care (EDAC) after	5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI) 2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2558 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery 3494 : Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: The CABG readmission measure, which was developed in close collaboration with STS, has a target population (i.e., isolated CABG patients) that is	5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: N/A	Coronary Artery Bypass Graft (CABG) 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: N/A 5b.1 If competing, why superior or rationale for additive value: N/A	hospitalization for heart failure (HF) 2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure 2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset	(RSMR) following acute myocardial infarction (AMI) 2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data 2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI) 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	harmonized with the above measures to the extent possible given the differences between clinical and administrative data. The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial MAZE procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to differentiate them from open maze procedures. The age range for the proposed CABG readmission and existing NQF-endorsed STS measure cohorts differs; STS measures are specified for age 18 and over, and the CABG readmission measure is currently specified for age 65 and over. The proposed CABG readmission measure is harmonized with the above measures to the extent			of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	possible given the different data sources used for development and reporting. 5b.1 If competing, why superior or rationale for additive value: This measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for coronary artery bypass graft (CABG)). The measure steward for the registry-based readmission measure for CABG is also CMS; STS developed the measure. Effort was taken to harmonize both the registry-based and administrative-based measures to the extent possible given the differences in data sources. CMS developed these two "competing" measures at the same time to allow for maximum flexibility in implementation for quality				

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	0130: Risk-Adjusted Deep Sternal Wound Infection	0131: Risk-Adjusted Stroke/Cerebrovascular Accident	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.
	improvement programs across different care settings. The STS cardiac surgery registry currently enrolls most, but not all, patients receiving CABG surgeries in the U.S. The proposed CABG readmission measure will capture all qualifying Medicare FFS patients undergoing CABG regardless of whether their hospital or surgeon participates in the STS registry. This claims-based CABG readmission measure was developed with the goal of producing a measure with the highest scientific rigor and broadest applicability. The measure is harmonized with the above existing and proposed measures to the extent possible given the different data sources used for development and reporting.				

Comparison of NQF #2515, NQF #1789, NQF #2558, and NQF #3494

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older. An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.	This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. 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. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five	The measure estimates a hospital-level RSMR for patients 18 years and older discharged from the hospital following a qualifying isolated CABG procedure. Mortality is defined as death from any cause within 30 days of the procedure date of an index CABG admission. An index CABG admission is the hospitalization for a qualifying isolated CABG procedure considered for the mortality outcome. The measure was developed using Medicare Fee-for-Service (FFS) patients 65 years and older and was tested in all-payer patients 18 years and older.	This measure estimates a hospital-level, risk-standardized mortality rate (RSMR) for patients 65 years and older discharged from the hospital following a qualifying isolated CABG procedure. Mortality is defined as death from any cause within 90 days of the procedure date of an index CABG admission. The measure was developed using Medicare Fee-for-Service (FFS) patients 65 years and older. An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the mortality outcome. This measure may be used in one or more to be defined 90-day payment models.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
		specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals. For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure 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 Medicare FFS, and are ACO assigned beneficiaries.		

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
		The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.		
Type	Outcome	Outcome	Outcome	Outcome
Data Source	Claims, Enrollment Data Data sources for the Medicare FFS measure: Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that	Claims Data sources for the Medicare FFS measure: HWR 1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort.	Claims Data sources for the Medicare FFS measure: Medicare Part A inpatient and Part B outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).	Claims Data sources for the Medicare FFS measure: Medicare Part A inpatient and Part B outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The American Community Survey (2009-2013): We examined disparities

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
	contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used. The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs. References: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_datadictionary_CABGreadmission_Fall2020_final_7.22.20.xlsx	2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission ACR 1. Medicare Part A claims data for calendar years 2013, 2014, and 2015. 2. Medicare Enrollment Database (EDB). Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx	The American Community Survey (2008-2012): The American Community Survey data is collected annually and an aggregated 5-years data was used to calculate the AHRQ socioeconomic status (SES) composite index score. Data sources for the all-payer testing: For our analyses to examine use in all-payer data, we used all-payer data from California. California is a diverse state, and, with more than 37 million residents, California represents 12% of the US population. We used the California Patient Discharge Data, a large linked database of patient hospital admissions. In 2006, there were approximately 3 million adult discharges from more than 450 non-Federal acute care hospitals. Records are linked by a unique patient identification number, allowing us to determine patient history from previous hospitalizations and to evaluate rates of both readmission and mortality (via linking with California vital statistics records). Using all-payer data from California, we performed analyses to determine whether the HF readmission measure can be	in performance according to the proportion of patients in each hospital who were dual eligible for both Medicare and Medicaid insurances. We also used the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score derived from the American Community Survey (2009-2013) to study the association between our measure and SES. Master Beneficiary Summary File (MBSF) The MBSF is an annually created file that contains enrollment information for all Medicare beneficiaries, including dual eligible status. Years 2014-2017 were used. The Society of Thoracic Surgeons (STS) CABG Composite Online Star Ratings Empiric validity testing was performed using the publicly available measure score of the Society of Thoracic Surgery (STS) CABG Composite Online Star Rating, which combines several measures across quality domains to score hospitals from one (low quality) to three (high quality) stars (The Society of Thoracic Surgeons, 2017). References

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
			applied to all adult patients, including not only FFS Medicare patients aged 65 years or older, but also non-FFS Medicare patients aged 18-64 years at the time of admission. Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF2258_CABGmortality_datadictionary.xlsx	Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. The Society of Thoracic Surgeons. STS Public Reporting Online. CABG Overall Composite Score. 2017. Available at:https://publicreporting.sts.org/search/cabg_report_card/hospital?title=&field_year_target_id=11&field_state_value=All. Accessed December 1, 2018. No data collection instrument provided Attachment Del18gHOP590DayCABGMortalityMeasureDataDictionary01042019-636824525665955768.xlsx
Level	Facility	Facility	Facility	Facility
Setting	Inpatient/Hospital	Inpatient/Hospital, Outpatient Services	Inpatient/Hospital	Inpatient/Hospital

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Numerator Statement	The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first 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 both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for 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 this measure is 30-day all-cause mortality. Mortality is defined as death for any reason within 30 days of the procedure date from the index admission for patients discharged from the hospital after undergoing isolated CABG surgery.	The outcome for this measure is 90-day all-cause mortality. Mortality is defined as death for any reason within 90 days of the procedure date from the index admission for patients 65 and older discharged from the hospital after undergoing isolated CABG surgery.
Numerator Details	The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge after undergoing isolated CABG surgery, excluding planned readmissions as defined below.	Outcome definition The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible	In the current publicly reported measure, we identify deaths for Medicare FFS patients 65 years or older in the Medicare Enrollment Database (EDB). Outcome Attribution:	This is an all-cause mortality measure, therefore any death within 90 days of the index procedure date from the index hospitalization is included in the measure outcome. We identify deaths for Medicare FFS patients 65

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	Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure. Planned Readmission Algorithm (Version 4.0) The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital. In brief, the algorithm identifies a short list of always planned readmissions (those where the principal discharge diagnosis is major organ transplant, obstetrical delivery, or maintenance chemotherapy) as well as those readmissions with a potentially planned procedure (e.g., total hip replacement) AND a non-acute principle discharge diagnosis code. For example, a readmission for colon resection is considered planned if the principal diagnosis is colon cancer but unplanned if the principal diagnosis is abdominal pain, as this	index admission, excluding planned readmissions as defined below. Rationale From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. It is important to note that for the HWR measure, a readmission is included as an index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure.	Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves a qualifying isolated CABG procedure is as follows: 1. If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the mortality outcome is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of index CABG procedure. Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates mortality risk even among transferred patients. 2. If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the mortality outcome is attributed to the second	years or older using the Medicare Enrollment Database (EDB). Numerator time window: 90 days from the procedure date of index CABG procedure. This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we are using this field to define the outcome and to which hospital the outcome is attributed when there are multiple hospitalizations within a single episode of care. Outcome Attribution: Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows: 1. If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the

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	might represent a complication of the CABG procedure or hospitalization. Readmissions that included potentially planned procedures with an acute principal diagnosis or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are not excluded from the measure outcome as they are considered unplanned in this measure. The planned readmission algorithm has three fundamental principles: 1. A few specific, limited types of care are always considered planned (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. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each	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/radiotherapy/im munotherapy, 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 HWR measure. In 2013, CMS applied the algorithm to its other readmission measures. For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled	hospital performing the index CABG procedure and the 30-day window starts with the date of index CABG procedure. Rationale: Care provided by the hospital performing the CABG procedure likely dominates mortality risk. 3. If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the mortality outcome is attributed to the first hospital performing the index (first) CABG procedure and the 30-day window starts with the date of index CABG procedure. Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates mortality risk even among transferred patients.	mortality outcome is attributed to the first hospital performing the index CABG procedure and the 90-day window starts with the date of index CABG procedure. Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates mortality risk even among transferred patients. 2. If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the mortality outcome is attributed to the second hospital performing the index CABG procedure and the 90-day window starts with the date of index CABG procedure. Rationale: Care provided by the hospital performing the CABG procedure likely dominates mortality risk. 3. If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the

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	measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the CABG measure with modifications. The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table). It should be noted that this approach differs from that adopted by STS for their registry-based measure, in which all 30-day readmissions were considered to be unplanned. Outcome Attribution Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows: 3. If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the readmission	"2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission" Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report. https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841		mortality outcome is attributed to the first hospital performing the index (first) CABG procedure and the 90-day window starts with the date of index CABG procedure. Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates mortality risk even among transferred patients.

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	outcome is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates readmission risk even among transferred patients. 4. If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the readmission outcome is attributed to the second hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: Care provided by the hospital performing the CABG procedure likely dominates readmission risk. 5. If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the readmission			

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	outcome is attributed to the first hospital performing the index (first) CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain. Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates readmission risk even among transferred patients.			

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Denominator Statement	The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.	The measure 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. ACR-Specific: 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.7 Denominator Details.	This claims-based measure can be used in either of two patient cohorts: (1) patients aged 65 years or older or (2) patients aged 18 years or older. We have tested the measure in both age groups. The cohort includes admissions for patients who receive a qualifying isolated CABG procedure (see the attached Data Dictionary) and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years or older who are Medicare FFS beneficiaries admitted to non-federal hospitals. For patients with more than one qualifying CABG surgery admission in the measurement period, the first CABG admission is selected for inclusion in the measure and the subsequent CABG admission(s) are excluded from the cohort.	This claims-based measure can be used in the patient cohort aged 65 years or older. The cohort includes admissions for patients who receive a qualifying isolated CABG procedure (see the attached Data Dictionary) and with a complete claims history for the 12 months prior to admission. CMS publicly reports this measure for those patients 65 years or older who are Medicare FFS beneficiaries admitted to non-federal hospitals. If a patient has more than one qualifying isolated CABG admission in the measure period, the first CABG admission is selected for inclusion in the measure and the subsequent CABG admission(s) are excluded from the cohort.
Denominator Details	In order to create a clinically coherent population for risk adjustment, and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant	To be included in the measure cohort, patients must meet the following inclusion criteria: 1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission; 2. Aged 65 or older;	The measure includes index admissions for patients: 1. Having a qualifying isolated CABG surgery during the index admission; 2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission,	The measure includes index admissions for patients: 1. Having a qualifying isolated CABG surgery during the index admission; 2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the index

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	valve or other major cardiac or vascular procedures).	3. Discharged alive from a non-federal short-term acute care hospital; and 4. Not transferred to another acute care facility. ACR- Specific: An additional criterion for the ACO version of this measure is 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 first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) 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 CCS 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	and enrolled in Part A during the index admission; and, 3. Aged 65 or over. Isolated CABG surgeries are defined as those CABG procedures performed without the following concomitant valve or other major cardiac, vascular, or thoracic procedures: 6. Valve procedures; 7. Atrial and/or ventricular septal defects; 8. Congenital anomalies; 9. Other open cardiac procedures; 10. Heart transplants; 11. Aorta or other non-cardiac arterial bypass procedures; 12. Head, neck, intracranial vascular procedures; or, 13. Other chest and thoracic procedures International Classification of Disease, 10th Revision (ICD-10) codes used to define the cohort are listed in the attached Data Dictionary.	admission, and enrolled in Part A during the index admission; and, 3. Aged 65 or over. 4. Isolated CABG surgeries are defined as those CABG procedures performed without the following concomitant valve or other major cardiac, vascular, or thoracic procedures: • Valve procedures; • Atrial and/or ventricular septal defects; • Congenital anomalies; • Other open cardiac procedures; • Heart transplants; • Aorta or other non-cardiac arterial bypass procedures; • Head, neck, intracranial vascular procedures; or, • Other chest and thoracic procedures This cohort is defined using International Classification of Diseases, 9th Revision, Clinical Modification (ICD-09-CM) procedure codes and/or International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-Procedure Coding System [PCS]) procedure codes identified in Medicare Part A Inpatient claims data. To create a clinically coherent

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		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 full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.		population for risk adjustment and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures see exclusion). ICD-09-CM and ICD-10-PCS procedure codes that indicate a patient has undergone a non-isolated CABG procedure (CABG surgeries that occur concomitantly with procedures that elevate patients' mortality risk) and thus does not meet criteria for inclusion in the measure cohort are used to identify such patients for removal from the cohort. The ICD-09-CM and ICD-10-PCS procedure codes are listed in the attached Data Dictionary.

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Exclusions	For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions: 1. Without at least 30 days post-discharge enrollment in FFS Medicare 2. Discharged against medical advice (AMA) 3. 3. Admissions for subsequent qualifying CABG procedures during the measurement period	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals; 2. Without at least 30 days post-discharge enrollment in Medicare FFS; 3. Discharged against medical advice; 4. Admitted for primary psychiatric diagnoses; 5. Admitted for rehabilitation; or 6. 6. Admitted for medical treatment of cancer.	The CABG surgery mortality measure excludes index admissions for patients: 1. With inconsistent or unknown vital status or other unreliable demographics (age and gender) data; or, 2. Discharged against medical advice (AMA). For patients with more than one qualifying CABG surgery admission in the measurement period, the first CABG admission is selected for inclusion in the measure and the subsequent CABG admission(s) are excluded from the cohort.	The 90-day CABG surgery mortality measure excludes index admissions for patients: 1. With inconsistent or unknown vital status or other unreliable data. 2. Who leave the hospital against medical advice (AMA). 3. With qualifying CABG procedures subsequent to another qualifying CABG procedure during the measurement period.
Exclusion Details	The CABG readmission measure excludes hospitalizations if they meet any of the following criteria: 1. Without at least 30 days post-discharge enrollment in FFS Medicare Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data.	Both the original HWR and ACR versions of the measure exclude index admissions for patients: 1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals. 2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB)	The CABG surgery mortality measure excludes index admissions for patients: 1. With inconsistent or unknown vital status or other unreliable demographics (age and gender) data. Rationale: We do not include stays for patients where the age (indicated in the claim) is greater than 115, where the gender (indicated in the claim) is neither male nor female, where the admission date (indicated in the claim) is after the date of death in the Medicare Enrollment Database,	The CABG surgery mortality measure excludes index admissions for patients: 1. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data. Rationale: We do not include stays for patients where the age (indicated in the claim) is greater than 115, where the gender (indicated in the claim) is neither male nor female, where the admission date (indicated in the claim) is after the date of death in the Medicare Enrollment Database, or where the date of death (in the

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
	Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 3. Admissions for subsequent qualifying CABG procedures during the measurement period. Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.	Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted. 3. Discharged against medical advice; identified using the discharge disposition indicator in claims data. Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. 4. Admitted for primary psychiatric diagnoses Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals. 5. Admitted for rehabilitation Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care. 6. Admitted for medical treatment of cancer Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well	or where the date of death (in the Medicare Enrollment Database) occurs before the date of discharge but the patient was discharged alive (indicated in the claim). 2. Discharged against medical advice (AMA). Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. This information is taken from the discharge disposition in the claim. 3. With more than one qualifying CABG surgery admission in the measurement period. Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.	Medicare Enrollment Database) occurs before the date of discharge but the patient was discharged alive (indicated in the claim). 2. Discharged against medical advice (AMA). Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge. This information is taken from the discharge disposition in the claim. 3. With more than one qualifying CABG surgery admission in the measurement period. Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and a higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions (additional claims indicating a CABG procedure was performed within 30-days of the index CABG procedure) from the cohort.

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		with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.		
Risk Adjustment	Statistical risk model	Statistical risk model	Statistical risk model	Statistical risk model
Stratification	N/A	N/A	N/A	N/A
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The	The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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 at the hospital, after accounting for patient risk. The hospital-specific	The measure estimates hospital-level 30-day all-cause RSMRs for CABG surgery using a hierarchical logistic regression model. 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 and Shahian, 2007). At the patient level, it models the log-odds of mortality within 30 days of the procedure date using age, sex, 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 mortality at the hospital, after accounting for	The measure estimates hospital-level, 90-day, all-cause, RSMRs for CABG surgery using a hierarchical logistic regression model. 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 and Shahian, 2007). At the patient level, it models the log-odds of mortality within 90 days of the procedure date using age, sex, 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 mortality at the hospital, after accounting for patient risk. The hospital-specific effects are

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	hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.	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 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	patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand and Shahian, 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" deaths to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted based on the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case 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, to be compared to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-	given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand and Shahian, 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" deaths to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 90 days predicted based on the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows a specific hospital's performance, given its case mix, to be compared to an average hospital's performance with the same case mix. Thus, a lower rate indicates lower-than-expected mortality rates or better quality, while a higher rate indicates higher-

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	The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet:	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 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 calculate 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 attributed to a hospital to calculate an expected value. To assess hospital performance for each reporting period, we re-estimate the model	expected mortality rates or better quality, while a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of mortality. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 deaths (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 years of data in that period. This calculation transforms the ratio of predicted over expected	than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of mortality. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 deaths (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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed mortality rate. The hierarchical logistic regression models are described fully in the original 90-

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	(https://qualitynet.org/inpatient/measures/readmission/methodology). References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery 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 and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for	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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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	into a rate that is compared to the national observed mortality rate. The hierarchical logistic regression models are described fully in the original methodology report (Suter et al. 2012). Reference: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Suter L, Wang C, Araas M, et al. Hospital-Level 30-day All-Cause Mortality Following Coronary Artery Bypass Graft Surgery; Updated Measure Methodology Report. 2012. The measure estimates hospital-level 30-day all-cause RSMRs for CABG surgery using a hierarchical logistic regression model. 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 and Shahian, 2007). At the patient level, it models the log-odds of mortality within 30 days of the procedure date using age, sex, selected clinical covariates, and a hospital-specific effect. At the	day CABG mortality measure methodology report (YNHHS/CORE, 2018). References Normand S-LT, Shahian DM. 2007. Statistical and clinical aspects of hospital outcomes profiling. Statistical Science 22(2): 206-226. Yale New Haven Health System/Center for Outcomes Research & Evaluation (YNHHS/CORE). Hospital-Level 90-day All-Cause Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery; Updated Measure Methodology Report. 2018. The measure estimates hospital-level, 90-day, all-cause, RSMRs for CABG surgery using a hierarchical logistic regression model. 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 and Shahian, 2007). At the patient level, it models the log-odds of mortality within 90 days of the procedure date using age, sex, selected clinical covariates, and a hospital-specific effect. At the hospital level, the approach models the hospital-specific effects as arising from a normal

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	patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality. The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific	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; https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. The measure estimates hospital-level 30-day all-cause RSRRs 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 hospital 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 at	hospital level, the approach models the hospital-specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of mortality at the hospital, 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 and Shahian, 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" deaths to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted based on the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It	distribution. The hospital effect represents the underlying risk of mortality at the hospital, 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 and Shahian, 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals. The RSMR is calculated as the ratio of the number of "predicted" deaths to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 90 days predicted based on the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows a specific hospital's performance, given its case mix, to be compared to an average hospital's performance with

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	intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are 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 intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are 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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet. References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of	the hospital, 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 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	conceptually allows a particular hospital's performance, given its case mix, to be compared to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, while a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of mortality. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 deaths (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	the same case mix. Thus, a lower rate indicates lower-than-expected mortality rates or better quality, while a higher rate indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of mortality. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the 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 deaths (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 years of data in that period. This calculation transforms the ratio of predicted over expected into a rate

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	Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.	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 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 calculate 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 attributed to a hospital to calculate an expected value. To assess hospital performance for each reporting	period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed mortality rate. The hierarchical logistic regression models are described fully in the original methodology report (Suter et al. 2012). Reference: 1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 2. Suter L, Wang C, Araas M, et al. Hospital-Level 30-day All-Cause Mortality Following Coronary Artery Bypass Graft Surgery; Updated Measure Methodology Report. 2012.	that is compared to the national observed mortality rate. The hierarchical logistic regression models are described fully in the original 90-day CABG mortality measure methodology report (YNHHS/CORE, 2018). References Normand S-LT, Shahian DM. 2007. Statistical and clinical aspects of hospital outcomes profiling. Statistical Science 22(2): 206-226. Yale New Haven Health System/Center for Outcomes Research & Evaluation (YNHHS/CORE). Hospital-Level 90-day All-Cause Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery; Updated Measure Methodology Report. 2018.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
		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 combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012). ACR-specific: 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		

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
		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; Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.		
Submission items	5.1 Identified measures: 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. 0119 : Risk-Adjusted Operative Mortality for CABG 0115 : Risk-Adjusted Surgical Re-exploration 0114 : Risk-Adjusted Postoperative Renal Failure 0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0130 : Risk-Adjusted Deep Sternal Wound Infection 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)	5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) 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 1551 : Hospital-level 30-day risk-standardized readmission rate	5.1 Identified measures: 0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization 0535 : 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention (PCI) for patients without ST segment elevation myocardial infarction (STEMI) and without cardiogenic shock 0536 : 30-day all-cause risk-standardized mortality rate following Percutaneous Coronary Intervention (PCI) for patients with ST segment elevation myocardial infarction (STEMI) or cardiogenic shock	5.1 Identified measures: 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: The target population is isolated CABG patients for the proposed 90-day CABG mortality measure and all of the above measures that have different measure focus but same target population. The clinical cohort exclusions are harmonized to the extent possible given the differences between clinical registry (STS) and administrative claims data. The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial MAZE procedures; STS excludes these

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
	1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) 2558 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery 3494 : Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: The CABG readmission measure, which was developed in close collaboration with STS, has a target population (i.e., isolated CABG patients) that is harmonized with the above measures to the extent possible given the differences between clinical and administrative data. The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial MAZE procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to	(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 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement	0123 : Risk-Adjusted Operative Mortality for Aortic Valve Replacement (AVR) + CABG Surgery 0122 : Risk-Adjusted Operative Mortality for Mitral Valve (MV) Replacement + CABG Surgery 0119 : Risk-Adjusted Operative Mortality for CABG 0115 : Risk-Adjusted Surgical Re-exploration 0114 : Risk-Adjusted Postoperative Renal Failure 0131 : Risk-Adjusted Stroke/Cerebrovascular Accident 0130 : Risk-Adjusted Deep Sternal Wound Infection 0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation) 0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization 1502 : Risk-Adjusted Operative Mortality for Mitral Valve (MV) Repair + CABG Surgery 1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic	procedures from the registry-based CABG mortality measure cohort because the version of registry data used for measure development did not allow for differentiation of epicardial and open maze procedures. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. In addition, the related claims-based 30-day isolated CABG mortality and readmission measures, which utilize the same definition of isolated CABG as this 90-day mortality measure, were validated using clinical registry data (STS Cardiac Surgery Registry data for the readmission measure and New York State Cardiac Surgery Registry data for the mortality measure). Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
	differentiate them from open maze procedures. The age range for the proposed CABG readmission and existing NQF-endorsed STS measure cohorts differs; STS measures are specified for age 18 and over, and the CABG readmission measure is currently specified for age 65 and over. The proposed CABG readmission measure is harmonized with the above measures to the extent possible given the different data sources used for development and reporting. 5b.1 If competing, why superior or rationale for additive value: This measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for coronary artery bypass graft (CABG)). The measure steward for the registry-based readmission measure for CABG is also CMS; STS developed the measure. Effort was taken to harmonize both the registry-based and administrative-based measures to the extent possible given the differences in data sources. CMS developed these two "competing" measures at the same time to allow for maximum flexibility in implementation for quality	year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an	obstructive pulmonary disease (COPD) hospitalization 2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. In addition, the related claims-based CABG readmission measure, which utilizes the same definition of isolated CABG as the mortality measure, was validated using STS clinical registry data. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to	receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: This measure was specifically developed for and may be used in 90-day payment models. It is not intended to replace the 30-day CABG mortality measure in its current programmatic use or public reporting.

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
	improvement programs across different care settings. The STS cardiac surgery registry currently enrolls most, but not all, patients receiving CABG surgeries in the U.S. The proposed CABG readmission measure will capture all qualifying Medicare FFS patients undergoing CABG regardless of whether their hospital or surgeon participates in the STS registry. This claims-based CABG readmission measure was developed with the goal of producing a measure with the highest scientific rigor and broadest applicability. The measure is harmonized with the above existing and proposed measures to the extent possible given the different data sources used for development and reporting.	outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: N/A	broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). 5b.1 If competing, why superior or rationale for additive value: The NQF-endorsed STS measure that has the same target population and similar measure focus as the proposed CABG mortality measure is the Risk-adjusted operative mortality for CABG (NQF #0119). The measure steward for the registry-based mortality measure for CABG is STS. In developing the measure, we sought to harmonize with the STS measure to the greatest extent feasible given competing measure design objectives and differences in the data source. The potential sources of discrepancy are target patient population, age, isolated CABG, period of observation, and included hospitals. The STS measure also assesses both deaths occurring during CABG hospitalization (in-hospital death, even if after 30 days) and deaths occurring within	

Measure	2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)	2558: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery	3494: Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery
			30 days of procedure date. As indicated above, the proposed measure uses a standard follow-up period of 30 days of procedure date in order to measure each patient consistently. The proposed claims-based measure has been tested and is appropriate for use in all-payer data for patients 18 years and over. Finally, the STS cardiac surgery registry currently enrolls most, but not all, patients receiving CABG surgeries in the U.S. The proposed CABG mortality measure will capture all qualifying Medicare FFS patients undergoing CABG regardless of whether their hospital or surgeon participates in the STS registry.	

Appendix F: Pre-Evaluation Comments

Comments received as of January 21, 2021.

Topic	Commenter	Comment
3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System	Anonymous	I strongly support this measure as well-coordinated outpatient care is key to admission prevention.
0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	Anonymous	I support this measure
0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	Anonymous	I support this measure
0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	Anonymous	I support this measure
1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	Anonymous	I support this measure

Topic	Commenter	Comment
2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	Anonymous	I support this measure
2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	Anonymous	I support this measure
3598: Median Time from ED Arrival to ED Departure for Discharged ED Patients	Anonymous	I support this measure
General comments on the draft report	Anonymous	I appreciate all efforts to improve outpatient care and reduce admissions
0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #330, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization. The FAH is concerned that even though the median reliability score was 0.57 for hospitals with at least 25 cases, reliability ranged from 0.14 to 0.96 and that the intraclass correlation coefficients (ICC) was 0.587. The FAH believes that the developer must increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g. 0.7 or higher) and an ICC of 0.6 or higher. In addition, the FAH is very concerned to see that the measure developer's rationale to not include social risk factors in the risk adjustment model was in part based on the recommendations from the report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program released in March of last year (ASPE, 2020). A fundament flaw within the ASPE report was the lack of any recommendation addressing how a single measure with

Topic	Commenter	Comment
		multiple accountability uses should address inclusion of social risk factors as is the case with this measure, which is both publicly reported and included in the Hospital Value-Based Purchasing program. Regardless of whether the testing of social risk factors produced results that were sufficiently significant, the FAH believes that no developer should rely on the recommendations of this report until the question of how to handle multiple uses is addressed along with the additional analysis using the American Community Survey. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered. Lastly, the FAH is concerned that there is insufficient variation in performance across hospitals and limited opportunities for improvement to support this measure's continued use in accountability programs. Specifically, the performance scores reported in 2b4. Identification of Statistically Significant and Meaningful Difference in Performance are generally low with only 110 hospitals identified as better than the national rate and 149 are worse than the national rate. We base our concerns on these results along with the discussion on improvement in section 4b1 of the measure submission form where only an increase of 0.1 absolute percentage points between July 2016-June 2017 and July 2018-June 2019 was found. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should continue to be endorsed. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program.2020.
0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #505, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. The FAH is concerned that even though the median reliability score was 0.51 for hospitals with at least 25 cases, reliability ranged from 0.14 to 0.91 and that the intraclass correlation coefficients (ICC) was 0.424. The FAH believes that the developer must

Topic	Commenter	Comment
		increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g. 0.7 or higher) and an ICC of 0.6 or higher. In addition, the FAH is very concerned to see that the measure developer's rationale to not include social risk factors in the risk adjustment model was in part based on the recommendations from the report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program released in March of last year (ASPE, 2020). A fundament flaw within the ASPE report was the lack of any recommendation addressing how a single measure with multiple accountability uses should address inclusion of social risk factors as is the case with this measure, which is both publicly reported and included in the Hospital Value-Based Purchasing program. Regardless of whether the testing of social risk factors produced results that were sufficiently significant, the FAH believes that no developer should rely on the recommendations of this report until the question of how to handle multiple uses is addressed along with the additional analysis using the American Community Survey. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered. Lastly, the FAH is concerned that there is insufficient variation in performance across hospitals and limited opportunities for improvement to support this measure's continued use in accountability programs. Specifically, the performance scores reported in 2b4. Identification of Statistically Significant and Meaningful Difference in Performance are generally low with only 17 hospitals identified as better than the national rate and 18 are worse than the national rate. We base our concerns on these results along with the discussion on improvement in section 4b1 of the measure submission form where only an increase of 0.6 absolute percentage points between July 2016-June 2017 and July 2018-June 2019 was found. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should continue to be endorsed. Reference:

Topic	Commenter	Comment
		Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program.2020
0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #506, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization. The FAH is concerned that even though the median reliability score was 0.56 for hospitals with at least 25 cases, reliability ranged from 0.13 to 0.96 and that the intraclass correlation coefficients (ICC) was 0.544. The FAH believes that the developer must increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g. 0.7 or higher) and an ICC of 0.6 or higher. In addition, the FAH is very concerned to see that the measure developer's rationale to not include social risk factors in the risk adjustment model was in part based on the recommendations from the report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program released in March of last year (ASPE, 2020). A fundament flaw within the ASPE report was the lack of any recommendation addressing how a single measure with multiple accountability uses should address inclusion of social risk factors as is the case with this measure, which is both publicly reported and included in the Hospital Value-Based Purchasing program. Regardless of whether the testing of social risk factors produced results that were sufficiently significant, the FAH believes that no developer should rely on the recommendations of this report until the question of how to handle multiple uses is addressed along with the additional analysis using the American Community Survey. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered. Lastly, the FAH is concerned that there is insufficient variation in performance across hospitals and limited opportunities for improvement to support this measure's continued use in accountability programs. Specifically, the performance scores reported in 2b4. Identification of Statistically Significant and Meaningful

Topic	Commenter	Comment
		Difference in Performance are generally low with only 44 hospitals identified as better than the national rate and 143 are worse than the national rate. We base our concerns on these results along with the discussion on improvement in section 4b1 of the measure submission form where only an increase of 0.2 absolute percentage points between July 2016-June 2017 and July 2018-June 2019 was found. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should continue to be endorsed. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program. 2020.
1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #1891, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization. The FAH is concerned that even though the median reliability score was 0.43 for hospitals with at least 25 cases, reliability ranged from 0.11 to 0.90 and that the intraclass correlation coefficients (ICC) was 0.406. The FAH believes that the developer must increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g. 0.7 or higher) and an ICC of 0.6 or higher. In addition, the FAH is very concerned to see that the measure developer's rationale to not include social risk factors in the risk adjustment model was in part based on the recommendations from the report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program released in March of last year (ASPE, 2020). A fundament flaw within the ASPE report was the lack of any recommendation addressing how a single measure with multiple accountability uses should address inclusion of social risk factors as is the case with this measure, which is both publicly reported and included in the Hospital Value-Based Purchasing program. Regardless of whether the testing of social risk factors produced results that

Topic	Commenter	Comment
		were sufficiently significant, the FAH believes that no developer should rely on the recommendations of this report until the question of how to handle multiple uses is addressed along with the additional analysis using the American Community Survey. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered. Lastly, the FAH is concerned that there is insufficient variation in performance across hospitals and limited opportunities for improvement to support this measure's continued use in accountability programs. Specifically, the performance scores reported in 2b4. Identification of Statistically Significant and Meaningful Difference in Performance are generally low with only 14 hospitals identified as better than the national rate and 52 are worse than the national rate. We base our concerns on these results along with the discussion on improvement in section 4b1 of the measure submission form where only an increase of 0.1 absolute percentage points between July 2016-June 2017 and July 2018-June 2019 was found. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should continue to be endorsed. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program. 2020.
2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #1891, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery. The FAH is concerned that even though the median reliability score was 0.60 for hospitals with at least 25 cases, reliability ranged from 0.27 to 0.92 and that the intraclass correlation coefficients (ICC) was 0.436. The FAH believes that the developer must increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g. 0.7 or higher) and an ICC of 0.6 or higher.

Topic	Commenter	Comment
		In addition, the FAH is very concerned to see that the measure developer's rationale to not include social risk factors in the risk adjustment model was in part based on the recommendations from the report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program released in March of last year (ASPE, 2020). A fundament flaw within the ASPE report was the lack of any recommendation addressing how a single measure with multiple accountability uses should address inclusion of social risk factors as is the case with this measure, which is both publicly reported and included in the Hospital Value-Based Purchasing program. Regardless of whether the testing of social risk factors produced results that were sufficiently significant, the FAH believes that no developer should rely on the recommendations of this report until the question of how to handle multiple uses is addressed along with the additional analysis using the American Community Survey. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered. Lastly, the FAH is concerned that there is insufficient variation in performance across hospitals and limited opportunities for improvement to support this measure's continued use in accountability programs. Specifically, the performance scores reported in 2b4. Identification of Statistically Significant and Meaningful Difference in Performance are generally low with only 6 hospitals identified as better than the national rate and 14 are worse than the national rate. We base our concerns on these results along with the discussion on improvement in section 4b1 of the measure submission form where only an increase of 0.6 absolute percentage points between July 2016-June 2017 and July 2018-June 2019 was found. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should continue to be endorsed. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk

Topic	Commenter	Comment
		Factors and Performance in Medicare's Value-Based Purchasing Program.2020.
2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #2888, Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions. The FAH appreciates that the developer included the Agency for Healthcare Research and Quality Socioeconomic Status Index and physician-specialist density as variables within the risk model. Unfortunately, the FAH remains concerned with the risk model's fit since the deviance R-squared was only 0.111. The FAH does not believe that the reasons for this result are adequately addressed and risk adjustment must be improved prior to re-endorsement. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should continue to be endorsed.
3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System	Submitted by Federation of American Hospitals	The Federation of American Hospitals (FAH) appreciates the opportunity to comment on Measure #3597, Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System. The FAH asks that the Standing Committee carefully consider whether the attribution methodology is reasonable and evidence-based. The FAH is also concerned that even though the median reliability score was 0.873 for practices with at least 15 clinicians and 18 patients with multiple chronic conditions, reliability ranged from 0.413 to 0.999. The FAH believes that the developer must increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g. 0.7 or higher). In addition, the FAH appreciates that the developer included the Agency for Healthcare Research and Quality Socioeconomic Status Index and physician-specialist density as variables within the risk model. Unfortunately, the FAH remains concerned with the risk model's fit since the deviance R-squared was only 0.105. The FAH does not believe that the reasons for this result are adequately addressed and risk adjustment must be improved prior to re-endorsement. As a result, the FAH requests that the Standing Committee carefully consider whether the measure as specified should be endorsed.

Topic	Commenter	Comment
0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization	Submitted by American Medical Association	The American Medical Association (AMA) appreciates the opportunity to comment on the NQF Quality Positioning System (QPS) Measure #330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization. This is an important measure which captures the unplanned readmission for any reason within 30 days of a patient's discharge from the hospital. In reviewing the calculation, we are disappointed to see the minimum measure score reliability result calculated at 0.14 and the intraclass correlation coefficient (ICC) calculated at 0.587, both using a minimum case number of just 25 patients. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability and require higher case minimums to allow for the overwhelming majority of hospitals to achieve an ICC of 0.6 or higher. The AMA is also extremely concerned that the measure developer used the recommendation to exclude social risk factors in the risk adjustment models for measures that are publicly reported as outlined in the recent report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program (ASPE, 2020). We believe that while the current testing may not have produced results that would indicate incorporation of the two social risk factors included in testing, this measure is currently used both for public reporting and value-based purchasing. A primary limitation of the ASPE report was that none of the recommendations adequately addressed whether it was appropriate to adjust for social risk factors in the same measure used for more than one accountability purpose, which is the case here. This discrepancy, along with the fact that the additional analysis using the American Community Survey is not yet released, must be addressed prior to any reliance on the recommendations within this report. We also note that the measure developer chose to include social risk factors in two measures (#2888 and #3597) under review; we ask that this inconsistency be considered and rectified. In addition, we question whether the measure continues to be useful to distinguish hospital performance and drive improvements based on the distribution of a hospital's performance scores. We raise this question

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		because only 110 hospitals performed better than the national rate, and 149 hospitals were worse (as noted in section 2b4). The discussion on improvement (as noted in section 4b1 of the measure submission form) found only an increase of 0.1 absolute percentage points between July 2016-June 2017 and July 2018-June 2019 in this measure. The AMA requests that the Standing Committee evaluate whether the measure continues to meet the measure evaluation criteria required for endorsement. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program.2020.
0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.	Submitted by American Medical Association	Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization The American Medical Association (AMA) appreciates the opportunity to comment on the NQF Quality Positioning System (QPS) Measure #505: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization. This is an important measure which captures the unplanned readmission for any reason within 30 days of a patient's discharge from the hospital. In reviewing the calculation, we are disappointed to see the minimum measure score reliability result calculated at 0.14 and the intraclass correlation coefficients (ICC) calculated at 0.424, both using a minimum case number of just 25 patients. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability and require higher case minimums to allow the overwhelming majority of hospitals to achieve an ICC of 0.6 or higher. The AMA is also extremely concerned that the measure developer used the recommendation to exclude social risk factors in the risk adjustment models for measures that are publicly reported as outlined in the recent report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program (ASPE, 2020). We believe that while the current testing may not have produced results that would

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		indicate incorporation of the two social risk factors included in testing, this measure is currently used both for public reporting and value-based purchasing. A primary limitation of the ASPE report was that none of the recommendations adequately addressed whether it was appropriate to adjust for social risk factors in the same measure used for more than one accountability purpose, which is the case here. This discrepancy, along with the fact that the additional analysis using the American Community Survey is not yet released, must be addressed prior to any reliance on the recommendations within this report. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review; we ask that this inconsistency be considered and rectified. In addition, we question whether the measure continues to be useful to distinguish hospital performance and drive improvements based on the distribution of a hospital's performance scores. We raise this question because only 17 hospitals performed better than the national rate and 18 hospitals were worse (as noted in in section 2b4). The discussion on improvement (as noted in section 4b1 of the measure submission form) found only an increase of 0.6 absolute percentage points between July 2016-June 2017 and July 2018-June 2019. The AMA requests that the Standing Committee evaluate whether the measure continues to meet the measure evaluation criteria required for endorsement. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program.2020.
0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization	Submitted by American Medical Association	506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization The American Medical Association (AMA) appreciates the opportunity to comment on NQF Quality Positioning System (QPS) Measure #506, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization. This is an important measure which captures the unplanned readmission for any reason within 30 days of a patient's discharge from the hospital.

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		The AMA is disappointed to see the minimum measure score reliability results calculated at 0.13 and the intraclass correlation coefficient (ICC) calculated at 0.544 using a minimum case number of 25 patients. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability and require higher case minimums to allow the overwhelming majority of hospitals to achieve an ICC of 0.6 or higher. The AMA is also extremely concerned to see that the measure developer used the recommendation to exclude social risk factors in the risk adjustment models for measures that are publicly reported as outlined in the recent report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program (ASPE, 2020). We believe that while the current testing may not have produced results that would indicate incorporation of the two social risk factors included in testing, this measure is currently used both for public reporting and value-based purchasing. A primary limitation of the ASPE report was that none of the recommendations adequately addressed whether it was appropriate to adjust for social risk factors in the same measure used for more than one accountability purpose, which is the case here. This discrepancy along with the fact that the additional analysis using the American Community Survey is not yet released must be addressed prior to any reliance on the recommendations within this report. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered and rectified. In addition, we question whether the measure continues to be useful to distinguish hospital performance and drive improvements based on the distribution of hospital's performance scores where only 44 hospitals performed better than the national rate and 143 hospitals were worse (as noted in section 2b4 and the discussion on improvement in section 4b1 of the measure submission form), and where there was only an increase of 0.2 absolute percentage points between July 2016-June 2017 and July 2018-June 2019. The AMA requests that the Standing Committee evaluate whether the measure continues to meet the measure evaluation criteria required for endorsement.

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		Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program.2020.
2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery	Submitted by American Medical Association	2515 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery The American Medical Association (AMA) appreciates the opportunity to comment on NQF Quality Positioning System (QPS) Measure #2515, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery. We are disappointed to see the minimum measure score reliability results of 0.27 and the intraclass correlation coefficients (ICC) was 0.436 using a minimum case number of 25 patients. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability and require higher case minimums to allow the overwhelming majority of hospitals to achieve an ICC of 0.6 or higher. The AMA is also extremely concerned to see that the measure developer used the recommendation to not include social risk factors in the risk adjustment models for measures that are publicly reported as outlined in the recent report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing program (ASPE, 2020). We believe that while the current testing may not have produced results that would indicate incorporation of the two social risk factors included in testing, this measure is currently used both for public reporting and value-based purchasing. A primary limitation of the ASPE report was that none of the recommendations adequately addressed whether it was appropriate to adjust for social risk factors in the same measure used for more than one accountability purpose, which is the case here. This discrepancy along with the fact that the additional analysis using the American Community Survey is not yet released must be addressed prior to any reliance on the recommendations within this report. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered and rectified.

Topic	Commenter	Comment
		In addition, we question whether the measure continues to be useful to distinguish hospital performance and drive improvements based on the distribution of hospital's performance scores where only 6 hospitals performed better than the national rate and 14 hospitals were worse (as noted in section 2b4 and the discussion on improvement in section 4b1 of the measure submission form),and where there was only an increase of 0.6 absolute percentage points between July 2016-June 2017 and July 2018-June 2019. The AMA requests that the Standing Committee evaluate whether the measure continues to meet the measure evaluation criteria required for endorsement. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program.2020.
1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization	Submitted by American Medical Association	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization The American Medical Association (AMA) appreciates the opportunity to comment on NQF Quality Positioning System (QPS) Measure #1891, Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization. This is an important measure which captures the unplanned readmission for any reason within 30 days of a patient's discharge from the hospital. The AMA is disappointed to see the minimum measure score reliability results calculated at 0.11 and the intraclass correlation coefficient (ICC) calculated at 0.406 using a minimum case number of 25 patients. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability and require higher case minimums to allow the overwhelming majority of hospitals to achieve an ICC of 0.6 or higher. The AMA is also extremely concerned to see that the measure developer used the recommendation to exclude social risk factors in the risk adjustment models for measures that are publicly reported as outlined in the recent report to Congress by Assistant Secretary for Planning and Evaluation (ASPE) on Social Risk Factors and Performance in Medicare's Value-based Purchasing

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		program (ASPE, 2020). We believe that while the current testing may not have produced results that would indicate incorporation of the two social risk factors included in testing, this measure is currently used both for public reporting and value-based purchasing. A primary limitation of the ASPE report was that none of the recommendations adequately addressed whether it was appropriate to adjust for social risk factors in the same measure used for more than one accountability purpose, which is the case here. This discrepancy along with the fact that the additional analysis using the American Community Survey is not yet released must be addressed prior to any reliance on the recommendations within this report. We also note that the developer chose to include social risk factors in two measures (#2888 and #3597) under review and we ask that this inconsistency be considered and rectified. In addition, we question whether the measure continues to be useful to distinguish hospital performance and drive improvements based on the distribution of hospital's performance scores where only 14 hospitals performed better than the national rate and 52 hospital were worse (as noted in section 2b4 and the discussion on improvement in section 4b1 of the measure submission form), and where there was only an increase of 0.1 absolute percentage points between July 2016-June 2017 and July 2018-June 2019. The AMA requests that the Standing Committee evaluate whether the measure continues to meet the measure evaluation criteria required for endorsement. Reference: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health & Human Services. Second Report to Congress on Social Risk Factors and Performance in Medicare's Value-Based Purchasing Program. 2020.

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2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions	Submitted by American Medical Association	2888 Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions The American Medical Association (AMA) appreciates the opportunity to comment on NQF Quality Positioning System (QPS) Measure #2888: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions. The AMA does not believe that the current risk adjustment model is adequate due to the deviance R-squared of 0.111, but appreciates that the measure developer included the Agency for Healthcare Research and Quality Socioeconomic Status Index and physician-specialist density as variables within the risk model. The AMA requests that the Standing Committee carefully consider whether this measure meets the validity criterion or if additional revisions are needed prior to endorsement.

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3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System	Submitted by American Medical Association	3597 Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System The American Medical Association (AMA) appreciates the opportunity to comment on NQF Quality Positioning System (QPS) Measure #3597: Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System. While this measure may be useful at the community or population level, the AMA believes it is not appropriate to attribute this utilization to an individual physician or practices. Our position is due to several factors. Specifically, the lack of evidence to support applying this measure to individual physicians or practices is particularly concerning. For example, the evidence form demonstrates that improved care coordination and programs focused on care management can lead to reductions in hospital admissions but requires multiple components such as a disease management program, health system, and/or hospital. We do not believe that sufficient evidence was provided to support the theory that physicians or practices, in the absence of some coordinated program or payment offset (e.g., care management fee), can implement structures or processes that can lead to improved outcomes for these patients. In addition, the measure developer did not provide a sufficient level of information to demonstrate how the attribution approach is linked to the evidence provided. We are also disappointed to see the minimum measure score reliability results of 0.413 for practices with at least 15 clinicians and 18 patients with multiple chronic conditions. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability. Lastly, the AMA does not believe that the current risk adjustment model is adequate due to the deviance R-squared of 0.105 but appreciates that the measure developer included the Agency for Healthcare Research and Quality Socioeconomic Status Index and physician-specialist density as variables within the risk model. The AMA requests that the Standing Committee carefully consider whether this measure meets the NQF measure evaluation criteria or if additional revisions are needed prior to endorsement.

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