NATIONAL QUALITY FORUM

MEASURE WORKSHEET

This document summarizes the evaluation of the measure as it progresses through NQF's Consensus Development Process (CDP). The information submitted by measure developers/stewards is included after the Brief Measure Information, Preliminary Analysis, and Pre-meeting Public and Member Comments sections.

To navigate the links in the worksheet: Ctrl + click link to go to the link; ALT + LEFT ARROW to return

Purple text represents the responses from measure developers.

Red text denotes developer information that has changed since the last measure evaluation review.

Brief Measure Information

NQF #: 2888

Corresponding Measures:

De.2. Measure Title: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

Co.1.1. Measure Steward: Centers for Medicare & Medicaid Services

De.3. Brief Description of Measure: 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).

1b.1. Developer Rationale: People with MCCs are more likely to be admitted to the hospital than those without chronic conditions or with a single chronic condition. Additionally, they are more likely to visit the emergency department, use post-acute care (such as skilled nursing facilities), and require home health assistance [1]. No quality measures specifically designed for this population exist to assess quality of care or to enable the evaluation of whether current efforts to improve care are successful; this measure is designed to

help fill that gap as called for in NQF's "Multiple Chronic Conditions Measurement Framework." [2]

The measure is focused on ACOs because better, coordinated care should lower the risk of hospitalization for this vulnerable population. The measure is designed to illuminate variation in hospital admission rates and incentivize ACOs to develop efficient and coordinated chronic disease management strategies that anticipate and respond to patients' needs and preferences. The measure is

also consistent with ACOs' commitment to deliver patient-centered care that fulfills the goals of the Department of Health and Human Services' National Quality Strategy – improving population health, providing better care, and lowering health care costs [3].

The rationale for measuring acute unplanned admissions is to assess the quality of care as experienced by the patient and to drive overall improvements in care quality, coordination, and efficiency that are not specific to certain diseases. Ambulatory care providers can act together to lower patients' risk for a wide range of acute illness requiring admission in several ways:

1. Provide optimal and accessible chronic disease management to reduce catastrophic sequelae of chronic disease. For example:
    a. Support healthy lifestyle behaviors and optimize medical management to minimize the risk for cardiovascular events such as

stroke and heart attacks; and

   b. Carefully monitor and act early to address chronic problems that require major interventions if allowed to progress (for example, assessment and treatment of peripheral artery disease in unresolving infections in order to prevent amputation).

2. Anticipate and manage the interactions between chronic conditions. For example:
   a. Closely monitor renal function in patients on diuretic therapy for heart failure and chronic kidney disease;
   b. Minimize polypharmacy to reduce drug-drug and drug-disease interactions; and
   c. Assess and treat depression to improve self-efficacy and self-management of chronic disease.
3. Provide optimal primary prevention of acute illnesses, such as recommended immunizations and screening.
4. Facilitate rapid, effective ambulatory intervention when acute illness does occur, whether related or unrelated to the chronic conditions. For example:
   a. Promptly prescribe antibiotics for presumed bacterial pneumonia and diuretic treatment for fluid overload in heart failure;
   b. Empower patients to recognize symptoms and to seek timely care; and
   c. Create accessible care options for patients (e.g., weekend or evening hours; capacity to deliver intravenous medications).
5. Partner with the government, local businesses, and community organizations to improve support for patients with chronic illness. For example:
   a. Collaborate with home nursing programs;
   b. Partner with local businesses to increase opportunities to engage in healthy lifestyle behaviors; and
   c. Provide outreach and services at senior centers.

A number of studies have shown that improvements in the delivery of health care services for ambulatory patients with MCCs can lower the risk of admission [4-13]. Demonstrated strategies include improving access to and continuity of care, supporting self-care in the home, better coordinating care across providers, and integrating social work, nursing, and medical services.

The goal of this measure is to illuminate variation among ACOs in hospital admission rates for people with MCCs and incentivize ACOs to expand efforts to develop and implement efficient and coordinated chronic disease management strategies that anticipate and respond to patients' needs and preferences. Recent data suggest that ACOs are indeed focused on strategies to reduce hospital admissions and use hospital admissions to evaluate the success of their interventions. A 2018 Annual ACO Survey showed that across all ACO types, top priorities included reducing avoidable emergency department (ED) visits and inpatient admissions, as well as reducing readmissions through better care transitions [14]. In a series of case studies on ACOs, ACOs with palliative care and serious illness programs often judged the outcomes of their programs by evaluating their effect on ED visits and hospital admissions [14]. These findings further support the use of hospital admissions as important outcomes in this setting as they are already widely recognized as signals of quality.

Citations:

1. Centers for Medicare and Medicaid Services. Chronic Conditions Among Medicare Beneficiaries, Chartbook: 2012 Edition. 2012; http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/Downloads/2012Chartbook.pdf. Accessed March 18, 2014.
2. National Quality Forum (NQF). Multiple Chronic Conditions Measurement Framework. 2012; http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227

3. U.S. Department of Health and Human Services. Multiple chronic conditions—A strategic framework: Optimum health and quality of life for individuals with multiple chronic conditions. December 2010; http://www.hhs.gov/ash/initiatives/mcc/mcc_framework.pdf. Accessed March 20, 2014.
4. Brown RS, Peikes D, Peterson G, Schore J, Razafindrakoto CM. Six features of Medicare coordinated care demonstration programs that cut hospital admissions of high-risk patients. Health Aff (Millwood). 2012;31(6):1156-1166.
5. van Loenen T, van den Berg MJ, Westert GP, Faber MJ. Organizational aspects of primary care related to avoidable hospitalization: a systematic review. Fam Pract. 2014;31(5):502-516.
6. Dorr DA, Wilcox AB, Brunker CP, Burdon RE, Donnelly SM. The effect of technology-supported, multidisease care management on the mortality and hospitalization of seniors. U Am Geriatr Soc. 2008;56(12):2195-2202.
7. Levine S, Steinman BA, Attaway K, Jung T, Enguidanos S. Home care program for patients at high risk of hospitalization. American Journal of Managed Care. 2012;18(8):e269-276.
8. Littleford A, Kralik D. Making a difference through integrated community care for older people. Journal of Nursing and Healthcare of Chronic Illness. 2010;2(3):178-186.
9. Bazemore, A., et al. (2018). "Higher Primary Care Physician Continuity is Associated With Lower Costs and Hospitalizations." Ann Fam Med. 16(6): 492-497.
10. O´Malley, A. S., et al. (2019). "New approaches to measuring the comprehensiveness of primary care physicians." Health Serv Res. 54(2): 356-366.
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12. Ruiz S, Snyder LP, Rotondo C, Cross-Barnet C, Colligan EM, Giuriceo K. Innovative Home Visit Models Associated With Reductions In Costs, Hospitalizations, And Emergency Department Use. Health Affairs. 2017;36(3):425-432
13. Edwards ST, Saha S, Prentice JC, Pizer SD. Preventing Hospitalization with Veterans Affairs Home-Based Primary Care: Which Individuals Benefit Most? Journal of the American Geriatrics Society. 2017;65(8):1676-1683
14. Roiland R, Bleser WK, Muhlestein D, Saunders RS. How Are ACOs Prioritizing Palliative Care and Other Serious Illness Strategies? Health Affairs Blog. 2020; published January 7, 2020.

S.4. 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.

S.6. 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.

S.8. Denominator 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.

De.1. Measure Type: Outcome

S.17. Data Source: Claims, Enrollment Data, Other

S.20. Level of Analysis: Other

IF Endorsement Maintenance – Original Endorsement Date: Dec 09, 2016 **Most Recent Endorsement Date:** Dec 09, 2016

IF this measure is included in a composite, NQF Composite#/title:

IF this measure is paired/grouped, NQF#/title:

De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results? Not applicable.

Preliminary Analysis: Maintenance of Endorsement

To maintain NQF endorsement endorsed measures are evaluated periodically to ensure that the measures still meets the NQF endorsement criteria ("maintenance"). The emphasis for maintaining endorsement is focused on how effective the measure is for promoting improvements in quality. Endorsed measures should have some experience from the field to inform the evaluation. The emphasis for maintaining endorsement is noted for each criterion.

Criteria 1: Importance to Measure and Report

1a. Evidence

1a. Evidence. The evidence requirements for a health outcome measure include providing empirical data that demonstrate a relationship between the outcome and at least one healthcare structure, process, intervention, or service; if these data not available, data demonstrating wide variation in performance, assuming the data are from a robust number of providers and results are not subject to systematic bias. For measures derived from patient report, evidence also should demonstrate that the target population values the measured outcome, process, or structure and finds it meaningful.

Summary of prior review in 2016

- The developer noted improvements in access to care, supporting self-care in the home, coordinating care across providers, and integrating social work, nursing, and medical services all have the potential to improve admission rates for patients with multiple chronic conditions (MCCs).
- The developer provides a logic model that suggest that Accountable Care Organizations (ACOs) should be able to impact unplanned admissions more feasibly than less integrated Medicare fee-for-service (FFS) providers 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 developer further suggests that ACOs may also need to engage with community organizations and health-related community services to facilitate effective chronic disease management.
- The developer cited several studies suggesting that improvements in the delivery of health care services for ambulatory patients with MCCs can lower the risk of admission.
- These strategies include improving access to and continuity of care, supporting self-care in the home, better coordinating care across providers, and integrating social work, nursing, and medical services.
- The Standing Committee noted the need to for measures assessing MCCs. The Standing Committee agreed that this measure could be an important first step to assessing the impact of frailty on readmissions.

Changes to evidence from last review

☐ **The developer attests that there have been no changes in the evidence since the measure was last evaluated.**

☒ **The developer provided updated evidence for this measure:**

Updates:

- The developer cites 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 developer further states that in case studies on ACOs, those with palliative care and serious illness programs often judged the outcomes of their programs by evaluating their effect on ED visits and hospital admissions.

Question for the Committee:

- The evidence provided by the developer is similar to that for the previous NQF review. Does the Standing Committee agree there is no need for repeat discussion and vote on Evidence?

Guidance from the Evidence Algorithm

Outcome Measure (Box 1) → Empirical evidence supports the relationship to at least one structure or process (Box 2) → PASS

Preliminary rating for evidence: ☒ Pass ☐ No Pass

1b. Gap in Care/Opportunity for Improvement and 1b. Disparities

Maintenance measures – increased emphasis on gap and variation

1b. Performance Gap. The performance gap requirements include demonstrating quality problems and opportunity for improvement.

- The developer mentions that this updated measure (see S.3.2 of measure reliability for updates) is currently not in use but provided testing data for the 2018 calendar year.
- For this period, a total of 2,515,727 Medicare FFS MCC patients were attributed to 559 ACOs that are part of the Medicare Shared Savings Program.
- Across ACOs, the developer reports 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 average and standard deviation was 38.9 ± 4.2 admissions per 100 person-years.
- The developer did provide data from the "original" measure from performance period of 2015 – 2019 and a decrease of performance scores from 62.92 in 2015 to 58.13 in 2019.

Disparities

- The developer provided disparity data for beneficiaries with dual eligibility.

- Distribution of Measure Scores by Proportion of Patients with Dual Eligibility
  - Quartile for proportion of dual-eligible patients
  - Q1 (0.6%-5.9%); Q2 (5.9%-9.9%); Q3 (10.0%-15.3%); Q4 (15.3%-91.5%)
  - Number of ACOs: 139//140//140//140
  - Mean: 36.8//39.5//39.4//39.7
  - Std Dev: 4.1//3.8//3.6//4.6
  - Maximum: 48.1//50.0//53.3//52.3
  - Median: 37.0//39.4//39.0//39.2
  - Minimum: 26.2//29.0//31.5//23.6

Questions for the Committee:

- *Does the Standing Committee have any concerns related to performance gap, specifically the lack of performance data for the current measure, over time?*

Preliminary rating for opportunity for improvement: ☐ High ☒ Moderate ☐ Low ☐ Insufficient

Committee Pre-evaluation Comments:
Criteria 1: Importance to Measure and Report (including 1a, 1b, 1c)

1a. Evidence to Support Measure Focus: For all measures (structure, process, outcome, patient-reported structure/process), empirical data are required. How does the evidence relate to the specific structure, process, or outcome being measured? Does it apply directly or is it tangential? How does the structure, process, or outcome relate to desired outcomes? For maintenance measures –are you aware of any new studies/information that changes the evidence base for this measure that has not been cited in the submission? For measures derived from a patient report: Measures derived from a patient report must demonstrate that the target population values the measured outcome, process, or structure.

- Patients with multiple chronic conditions focus of quality improvement
- Maintenance measure and developer did provided additional evidence to support the measure
- No concerns
- I am not aware of any new studies/information that changes the evidence base for this measure
- The evidence provided supports this outcome measure. Quality of ACOs are measured by acute unplanned admissions. Measure update to include diabetes and SRFs.
- Measure focus is combination of 9 categories with varying risks related to readmissions. This combination of 9 risk categories with varying risk profiles presents unique risk patterns that very dissimilar. This dissimilarity makes a very complicated risk profile that does provide an easily understandable risk pattern for patients (?and physicians) to understand and apply to patients.

1b. Performance Gap: Was current performance data on the measure provided? How does it demonstrate a gap in care (variability or overall less than optimal performance) to warrant a national performance measure? Disparities: Was data on the measure by population subgroups provided? How does it demonstrate disparities in the care?

- IQR 36.5-41.5, sufficient gap
- Performance gap noted and developer showed "original" measure improvement from 2015-2019 and disparity captured by dual eligibility but may not give an in-depth disparities lens. There are likely additional subgroups that should be evaluated for impact.
- No concerns
- Yes. Variability presents an opportunity for improvement. Disparities noted for Dual Eligible Patients

- Data for the updated measure isn't available. Performance data for the current version was provided.
- The performance gap is difficult to understand. Patients with multiple risks have worse outcomes, perhaps independently of interventions.

Criteria 2: Scientific Acceptability of Measure Properties

2a. Reliability: Specifications and Testing

2b. Validity: Testing; Exclusions; Risk-Adjustment; Meaningful Differences; Comparability; Missing Data

Reliability

2a1. Specifications requires the measure, as specified, to produce consistent (reliable) and credible (valid) results about the quality of care when implemented. For maintenance measures – no change in emphasis – specifications should be evaluated the same as with new measures.

2a2. Reliability testing demonstrates if the measure data elements are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period and/or that the measure score is precise enough to distinguish differences in performance across providers. For maintenance measures – less emphasis if no new testing data provided.

Validity

2b2. Validity testing should demonstrate the measure data elements are correct and/or the measure score correctly reflects the quality of care provided, adequately identifying differences in quality. For maintenance measures – less emphasis if no new testing data provided.

2b2-2b6. Potential threats to validity should be assessed/addressed.

Composite measures only:

2d. Empirical analysis to support composite construction. Empirical analysis should demonstrate that the component measures add value to the composite and that the aggregation and weighting rules are consistent with the quality construct.

Complex measure evaluated by Scientific Methods Panel? ☒ **Yes** ☐ **No**

Evaluators: NQF Scientific Methods Panel (SMP)
SMP Rating:

- **R:** H-7; M-1; L-0; I-0 (Pass)
- **V:** H-3; M-3; L-2; I-0 (Pass)

Methods Panel Review (Combined)
Methods Panel Evaluation Summary:
This measure was reviewed by the Scientific Methods Panel and discussed on the call. A summary of the measure and the Panel discussion is provided below.

Specifications:

- The developer has made several changes to the measure, including updates to the:
  - Cohort by adding diabetes as a cohort-qualifying condition.
  - Outcome by focusing on admissions where risk can be reduced by providing high-quality ambulatory care.
  - Risk-adjustment model by adding frailty risk variables and social risk factors to the model and applying the model to the updated ACO MCC measure

Reliability

- The SMP did not raise any major concerns with reliability testing.
- The developer performed reliability testing at the measure score-level:
    - The median signal-to-noise reliability was 0.96 for all ACO's 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.
    - It should be noted that although the range was 0.12 to 0.99, the mean was 0.95 with a standard deviation of 0.05.
    - A split-half analysis was not provided.

Validity

- The developer conducted face validity testing and empirical validity testing at the measure score level.
    - For face validity, a 10-person technical expert panel (TEP) was convened to provide input as to the conditions, groupings, and modeling. Public commenting was also requested.
    - A quantitative analysis for face validity was not conducted.
- For the empirical validity testing, 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 –Consumer Assessment of Healthcare Providers and Systems (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*.
    - There was little to no correlation between the ACO measure and the CAHPS measures, as expected.
    - There was correlated with the readmissions measure (spearman correlation 0.42, p<.001), as expected.
    - The ACO MCC measure was weakly positively correlated with ACO27, Diabetes Poor Control, with a correlation coefficient of 0.18 (p<.001), as expected.
    - However, the developer reported a slightly negative but insignificant correlation with the control of high blood pressure measure (-0.07, p=0.673), which was not hypothesized. The developer mentions that this may be due to the lack of case-mix adjustment of the blood pressure measure across ACOs.
    - Some SMP members raised concern with the results of the validity testing: noting that "4 of the 5 comparator measures hypothesized a weak or poor relationship with the measure" and "two measures can be uncorrelated because they have no conceivable relationship to each other."
- Risk adjustment: The risk adjustment model utilized 49 variables; demographic (age), 46 clinical (diagnosis groupers and functional status), and two social risk variables (Agency for Healthcare Research & Quality Socioeconomic Status [AHRQ SES] index and physician specialist density)
    - Some SMP members raised concern regarding the model fit, stating that, "the model was evaluated using deviance R-squared, which was 0.111 indicating the model explains 11.1% of variation in admission rates." However, others mentioned that this was "consistent with other risk adjustment models that have been approved."

Questions for the Committee regarding reliability:

- *Does the Standing Committee have any concerns that the measure can be consistently implemented (i.e., are measure specifications adequate)?*
- *The Scientific Methods Panel is satisfied with the reliability testing for the measure. Does the Standing Committee think there is a need to discuss and/or vote on reliability?*

Questions for the Committee regarding validity:

- *Does the Standing Committee have any concerns regarding the validity of the measure (e.g., exclusions, risk-adjustment approach, etc.)?*
- *The Scientific Methods Panel is satisfied with the validity analyses for the measure. Does the Standing Committee think there is a need to discuss and/or vote on validity?*

Preliminary rating for reliability: ☒ **High** ☐ **Moderate** ☐ **Low** ☐ **Insufficient**

Preliminary rating for validity: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:
Criteria 2: Scientific Acceptability of Measure Properties (including all 2a, 2b, and 2c)

2a1. Reliability-Specifications: Which data elements, if any, are not clearly defined? Which codes with descriptors, if any, are not provided? Which steps, if any, in the logic or calculation algorithm or other specifications (e.g., risk/case-mix adjustment, survey/sampling instructions) are not clear? What concerns do you have about the likelihood that this measure can be consistently implemented?

- No issues
- No concern-claims
- No concerns
- No concerns
- I don't have any concerns about the consistent implementation of this measure
- Data elements are clearly defined but are a bit peculiar. The 10-day exclusion period for readmissions seems arbitrary and, possibly unnecessary.

2a2. Reliability - Testing: Do you have any concerns about the reliability of the measure?

- S/N median 0.96. High.
- No concerns
- No concerns
- No
- No. Signal-to-noise used to measure reliability
- Reliability seems ok. Data elements are well-defined.

2b1. Validity -Testing: Do you have any concerns with the testing results?

- Need to accept ACO attribution method to consider a valid measure.
- No concern, agree would like to better understand not using the SES index for this measure
- No concerns
- How long has this measure been in use?
- No
- The impact of interventions on patients with varying risk profiles is a bit suspect. It is not clear to me how the Authors adjusted their model to define risk variables that are unrelated to quality of care so that the outcome measure reflects care quality. This seems like a difficult, if not impossible, task that needs more definition and explanation.

2b2-3. Other Threats to Validity (Exclusions, Risk Adjustment) 2b2. Exclusions: Are the exclusions consistent with the evidence? Are any patients or patient groups inappropriately excluded from the measure? 2b3. Risk Adjustment: If outcome (intermediate, health, or PRO-based) or resource use performance measure: Is there a conceptual relationship between potential social risk factor variables and the measure focus? How well do social risk factor variables that were available and analyzed align with the conceptual description provided? Are all of the risk-adjustment variables present at the start of care (if not, do you agree with the rationale

provided)? Was the risk adjustment (case-mix adjustment) appropriately developed and tested? Do analyses indicate acceptable results? Is an appropriate risk-adjustment strategy included in the measure?

- No concerns
- No concerns
- No concerns
- Yes
- Risk adjustments include frailty/disability and social risk factors - AHRQ SES index and Low physician-specialist density
- Risk adjustment seems appropriate. I am more concerned about the conceptual relationship between risk factors and measure outcomes/focus. It is obscure how, or if, interventions impact readmissions. Further, risk adjustment methods are skewed with some risks having much more risk of readmissions than others. It is not at all clear how lumping all risks with varying risk-levels into a single risk score can provide meaningful metrics for improvement.

2b4-6. Threats to Validity (Statistically Significant Differences, Multiple Data Sources, Missing Data) 2b4. Meaningful Differences: How do analyses indicate this measure identifies meaningful differences about quality? 2b5. Comparability of performance scores: If multiple sets of specifications: Do analyses indicate they produce comparable results? 2b6. Missing data/no response: Does missing data constitute a threat to the validity of this measure?

- No
- Moderate
- No concerns
- No
- Five measures were identified with possible correlation. Testing showed ACO8-Risk Standardized, All Condition Readmission showed a strong correlation. Missing social risk factors data would not affect the measure.
- I do not have doubts about data sources or validity. My main concerns are about the analytical methods.

Criterion 3. Feasibility

Maintenance measures – no change in emphasis – implementation issues may be more prominent

3. Feasibility is the extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

- The developer reports that all data elements are in defined fields in administrative claims, and as such poses "no data collection burden to measure entities."
- The developer further notes that there are no fees or licensing associated with the use of this measure.

Questions for the Committee:

- *Does the Standing Committee have any concerns related to feasibility?*

Preliminary rating for feasibility: ☒ **High** ☐ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:
Criteria 3: Feasibility

3. Feasibility: Which of the required data elements are not routinely generated and used during care delivery? Which of the required data elements are not available in electronic form (e.g., EHR or other electronic sources)? What are your concerns about how the data collection strategy can be put into operational use?

- No concerns. Administrative data measure
- Feasible-claims
- No concerns
- None
- No concerns. The measure uses data from administrative claims
- Nearly all data elements are routinely generated in most EHR's or other electronic sources.

Criterion 4: Usability and Use

Maintenance measures – increased emphasis – much greater focus on measure use and usefulness, including both impact/improvement and unintended consequences

4a. Use (4a1. Accountability and Transparency; 4a2. Feedback on measure)

4a. Use evaluate the extent to which audiences (e.g., consumers, purchasers, providers, policymakers) use or could use performance results for both accountability and performance improvement activities.

4a.1. Accountability and Transparency. Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

Planned use in an accountability program? ☒ Yes ☐ No

Accountability program details

- The developer reports that this updated measure (see S.3.2 of measure reliability for updates) is not yet in use and that CMS has proposed to include this updated measure in the APM Performance Pathway quality measure set to be reported on by Medicare ACOs.
- The developer also states that this updated measure will replace the original measure in the Medicare Shared Savings Program (MSSP) beginning with Performance Year 2021, if finalized by CMS.

4a.2. Feedback on the measure by those being measured or others. Three criteria demonstrate feedback: 1) those being measured have been given performance results or data, as well as assistance with interpreting the measure results and data; 2) those being measured and other users have been given an opportunity to provide feedback on the measure performance or implementation; 3) this feedback has been considered when changes are incorporated into the measure

Feedback on the measure by those being measured or others

- The developer notes that this measure is not currently in use and cites feedback mechanisms from the use of the original measure within MSSP.
- The developer mentions that measure information, including results, are provided through:
  - Annual Quality Reports;
  - Detailed specifications on measure calculation and the calculation of benchmarks are on the CMS website; and

- Educational webinars

- The developer states that for the original measure, ACOs had the opportunity to ask questions about the measure during webinars or submit questions to either the Model/Program-specific mailbox or the Quality Payment Program Service Center.
- The developer also notes that in 2019 and 2020 during rulemaking, commenters suggested CMS provide more actionable information to ACOs as part of their quality reports, such as the number of patients included in the numerator/denominator and the patients included. Questions related to interpretation of the measure performance rate have been answered primarily using resources provided to ACOs and CMS' Technical Assistance to ACOs including question-and-answer support.

Additional Feedback:

- This measure was listed on the 2019 Measures Under Consideration list and reviewed by the Measure Applications Partnership (MAP) Clinician Workgroup.
- The MAP final recommendation for this measure was "conditional support for rulemaking," with the condition of submission to the NQF for endorsement review.
- For the previously used measure, during CMS Learning Collaborative Webinars, successful ACOs have presented to peers on the use of admission measures as part of internal quality improvement initiatives. ACOs have expressed that tracking to admission rates is a useful monitoring approach.

***Questions for the Committee**:*

- *How can the performance results be used to further the goal of high-quality, efficient healthcare?*
- *How has the measure been vetted in real-world settings by those being measured or others?*

Preliminary rating for Use: ☒ **Pass** ☐ **No Pass**

4b. Usability (4a1. Improvement; 4a2. Benefits of measure)

4b. Usability evaluate the extent to which audiences (e.g., consumers, purchasers, providers, policymakers) use or could use performance results for both accountability and performance improvement activities.

4b.1 Improvement. Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated.

Improvement results:

- The developer notes that this updated measure (see S.3.2 of measure reliability for updates) is not currently in use.

4b2. Benefits vs. harms. Benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such evidence exists).

Unexpected findings (positive or negative) during implementation

- The developer notes that this updated measure (see S.3.2 of measure reliability for updates) is not currently in use.

Potential harms

- The developer did not discuss any potential harms.

Additional Feedback:

- None

***Questions for the Committee**:*

- *Does the Standing Committee have any concerns related Usability?*
- *How can the performance results be used to further the goal of high-quality, efficient healthcare?*

- *Do the benefits of the measure outweigh any potential unintended consequences?*

Preliminary rating for Usability and use: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:
Criteria 4: Usability and Use

4a1. Use - Accountability and Transparency: How is the measure being publicly reported? Are the performance results disclosed and available outside of the organizations or practices whose performance is measured? For maintenance measures - which accountability applications is the measure being used for? For new measures - if not in use at the time of initial endorsement, is a credible plan for implementation provided? 4a2. Use - Feedback on the measure: Have those being measured been given performance results or data, as well as assistance with interpreting the measure results and data? Have those being measured or other users been given an opportunity to provide feedback on the measure performance or implementation? Has this feedback has been considered when changes are incorporated into the measure?

- Need to accept attribution method. Would be interested in analysis of whether ACOs better control admissions for patients with high levels of care from ACO providers vs those more loosely attached.
- The measure was used in the past and is under review for the MAP recommendations--usable
- No concerns
- Unsure
- Updated measure not in use. Current version used in the Medicare Shared Savings Program. Feedback obtained from ACOs being measured. Reported use by ACOs for internal quality improvement and ACOs report measure as useful
- Feedback and comprehensive dissemination of measure results is mandatory to gauge any impact of this metric.

4b1. Usability – Improvement: How can the performance results be used to further the goal of high-quality, efficient healthcare? If not in use for performance improvement at the time of initial endorsement, is a credible rationale provided that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations? 4b2. Usability – Benefits vs. harms: Describe any actual unintended consequences and note how you think the benefits of the measure outweigh them.

- Attribution can assign patients with low affinity to ACO (but higher than to other providers) to ACO with limited ability for ACO to influence admissions, and risk that efforts to control will lead to leakage to other providers.
- No potential harm noted
- No concerns
- The developer did not discuss any potential harms.
- No harm identified
- I am not sure that a credible rationale for improvement is provided by these metrics. Some advanced testing of this metric might help to solidify the value of this measure.

Criterion 5: Related and Competing Measures

Related or competing measures

The developer states a related measure:

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

Harmonization

- 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.

Committee Pre-evaluation Comments: Criterion 5: Related and Competing Measures

5. **Related and Competing: Are there any related and competing measures? If so, are any specifications that are not harmonized? Are there any additional steps needed for the measures to be harmonized?**

- Low correlation with CAHPS measures needs exploration.
- Measure appears to be harmonized with like measure
- No concerns
- Yes and they are harmonized to the extent possible
- There is one competing measures. Harmonization done to furthest extent
- No apparent related measures.

Public and Member Comments

Comments and Member Support/Non-Support Submitted as of: 01/21/2021

- Comment by: American Medical Association

  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.

- Comment 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.

- Comment by: Anonymous

  I support this measure.

- Of the 1 NQF member who have submitted a support/non-support choice:
  - 1 supports the measure
  - 0 do not support the measure

Scientific Acceptability: Preliminary Analysis Form

Measure Number: 2888
Measure Title: ACO Risk-Standardized Acute Admission Rates for Patients with Multiple Chronic Conditions
Type of measure:
☐ **Process** ☐ **Process: Appropriate Use** ☐ **Structure** ☐ **Efficiency** ☐ **Cost/Resource Use**
☒ **Outcome** ☐ **Outcome: PRO-PM** ☐ **Outcome: Intermediate Clinical Outcome** ☐ **Composite**
Data Source:
☒ **Claims** ☐ **Electronic Health Data** ☐ **Electronic Health Records** ☐ **Management Data**
☐ **Assessment Data** ☐ **Paper Medical Records** ☐ **Instrument-Based Data** ☒ **Registry Data**
☒ **Enrollment Data** ☒ **Other**

Panel Member #9: Medicare Enrollment Database (EDB), Medicare Fee-for-Service (FFS) administrative claims data (Parts A and B), Medicare FFS non-institutional carrier claims, Durable Medical Equipment (DME) claims; American Community Survey (ACS); Area Health Resources File (AHRF).

Level of Analysis:
☐ **Clinician: Group/Practice** ☐ **Clinician: Individual** ☒ **Facility** ☐ **Health Plan**
☐ **Population: Community, County or City** ☐ **Population: Regional and State**
☒ **Integrated Delivery System** ☒ **Other:** Accountable Care Organization
Measure is:
☒ **New** ☒ **Previously endorsed (**NOTE: Empirical validity testing is expected at time of maintenance review; if not possible, justification is required.)

RELIABILITY: SPECIFICATIONS

1. **Are submitted specifications precise, unambiguous, and complete so that they can be consistently implemented?** ☒ **Yes** ☐ **No**

Submission document: "MIF_xxxx" document, items S.1-S.22

NOTE*: NQF staff will conduct a separate, more technical, check of eCQM specifications, value sets, logic, and feasibility, so no need to consider these in your evaluation.*

Panel Member #1: Yes. The rationale for attribution and those specialists excluded is provided. Assumptions behind the decision are somewhat arbitrary (i.e. cancer specialists really are essentially PCP's for cancer patients and responsible for coordination of care) and the definition of no "dominant specialist" is clearly stated. but the definitions were made in alignment with TEP recommendations and is reasonable.

2. **Briefly summarize any concerns about the measure specifications.**

Panel Member #2: None

Panel Member #4: The cohort qualifying conditions include certain chronic conditions related to the nervous, endocrine, cardiovascular, respiratory, and digestive systems but exclude other chronic conditions related to the integumentary, skeletal, muscular, lymphatic, urinary, and reproductive systems. Why is that? If the rational is that the cohort qualifying conditions are those "that most increased risk of admission" then wouldn't a measure that includes the non-qualifying conditions be a useful comparison group for purposes of validity?

Panel Member #5: a.)Operational definition of "no different" performance not specified (39.5% in item 1b.2). That would be about ½ standard deviation in a normal distribution. Clearly, the distribution must be skewed as 41.2& perform "better than the national rate", while only 19.3% perform "worse than the national rate." Perhaps the use of the median value—given the long positive tail—would provide a more representive distribution high and low performers. b.)Is the calculation based on years after 65 and on Medicare or the age of the individuals involved?

Panel Member #8: No great concerns although I did have to read the numerator exclusions a couple of time and convince myself that the admission does not reflect quality of care by the assigned clinician or clinician group. Attribution plays a huge role here, saying that the assigned clinician or clinician group is not responsible for oversight of care given in a SNF or acute rehabilitation unit – defects in which could

result in an unplanned admission. Definitively, the "integrated delivery system" should be by definition. I did not understand the reason for the 10-day buffer period after a discharge. It seems to excuse a lack of coordination during that period of time. Hospice is another consideration as presentation to an EC after admission to hospice may represent a failure to convey the true purpose of hospice care by the attributable clinician and is a failure of the integrated system.

Panel Member #9: No concerns

RELIABILITY: TESTING

Submission document: "MIF_xxxx" document for specifications, testing attachment questions 1.1-1.4 and section 2a2

3. **Reliability testing level** ☒ **Measure score** ☒☐ **Data element** ☐ **Neither**
4. **Reliability testing was conducted with the data source and level of analysis indicated for this measure** ☒ **Yes** ☒☐ **No**
5. If score-level and/or data element reliability testing was NOT conducted or if the methods used were NOT appropriate, was **empirical *VALIDITY* testing** of **patient-level data** conducted?

☐ **Yes** ☐ **No**

6. **Assess the method(s) used for reliability testing**

Submission document: Testing attachment, section 2a2.2

Panel Member #1: S/N analysis

Panel Member #2: Signal-to-noise analysis.

Panel Member #4: Developer used the formula for signal-to-noise reliability presented by Adams et al. and the formula for intraclass correlation coefficient (ICC) presented by Nakagawa et al. to calculate individual clinician-level and TIN-level reliability scores

Panel Member #6: Developers estimated the ACO-level reliability using signal-to-noise analysis. The variation between ACOs ('signal') comprises the total variation ('noise' and 'signal') in the outcome in this case because the reliability of any one ACO's measure score will vary depending on the number of patients. ACOs with higher volume will tend to have more reliable scores, while those with lower volume will tend to have less reliable scores.

Panel Member #8: Signal to noise analysis and intraclass correlation coefficient.

Panel Member #9: signal-to-noise and ICC analysis performed

7. **Assess the results of reliability testing**

Submission document: Testing attachment, section 2a2.3

Panel Member # 1: S/N score for ACOs with at least one MCC patient had a mean of 0.95, IQR of 0.94-0.98 Reliability was high.

Panel Member #2: The median signal-to-noise reliability score was 0.96 for all MSSP ACOs with at least one attributed MCC patient (n=559) (Interquartile Range [IQR]: 0.94-0.98), which indicate high reliability.

Panel Member #4: Because the measured entity is an ACO the denominator is large and the reliability is high

Panel Member # 6: Signal-to-Noise: The median signal-to-noise reliability score was calculated for ACOs with at least 1 attributed patient. The median reliability score was 0.96, ranging from 0.12 to 0.99.

Panel Member # 8: The median signal-to-noise reliability was 0.96 for all ACO's 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 is not provided. It should be noted that although the range was 0.12 to 0.99, the mean was 0.95 with a standard deviation of 0.05.

Panel Member # 9: Analysis demonstrated high reliability (0.96)

8. Was the method described and appropriate for assessing the proportion of variability due to real differences among measured entities? NOTE: If multiple methods used, at least one must be appropriate.

Submission document: Testing attachment, section 2a2.2

☒ **Yes**

☐ **No**

☐ **Not applicable** (score-level testing was not performed)

9. Was the method described and appropriate for assessing the reliability of ALL critical data elements?

Submission document: Testing attachment, section 2a2.2

☒ **Yes**

☐ **No**

☒ **Not applicable** (data element testing was not performed)

10. **OVERALL RATING OF RELIABILITY** (taking into account precision of specifications and **all** testing results):

☒ **High** (NOTE: Can be HIGH **only if** score-level testing has been conducted)

☒ **Moderate** (NOTE: Moderate is the highest eligible rating if score-level testing has **not** been conducted)

☐ **Low** (NOTE: Should rate **LOW** if you believe specifications are NOT precise, unambiguous, and complete or if testing methods/results are not adequate)

☐ **Insufficient** (NOTE: Should rate **INSUFFICIENT** if you believe you do not have the information you need to make a rating decision)

11. **Briefly explain rationale for the rating of OVERALL RATING OF RELIABILITY and any concerns you may have with the approach to demonstrating reliability.**

Panel Member #1: S/N ratios were high. NOTE: have not seen scores this high in prior measures and would like confirmation of the accuracy.

Panel Member #2: The median reliability score of 0.96 is considered high.

Panel Member #4: Preference is still for reporting reliability results stratified by case volume

Panel Member #5: Reliability testing was very good base on n=559 ACO data.

Panel Member #6: Results of signal-to-noise show high reliability. It is somewhat surprising that the measure can include ACOs with only ONE patient attributed. Would like further explanation of how "signal" comprises total variation in this measure (no "noise")?

Panel Member #7: The median signal-to-noise reliability score was 0.96 for all MSSP ACOs with at least one attributed MCC patient (n=559) (Interquartile Range [IQR]: 0.94-0.98). Table 1 shows the distribution of the signal-to-noise reliability results

Panel Member #8: Although it would seem that for possibly some low volume ACO's the reliability may be close to 0.12 (the minimum), the overall results for the 559 ACO's with at least one patient was high with a tight standard deviation.

Panel Member #9: No concerns

VALIDITY: ASSESSMENT OF THREATS TO VALIDITY

12. **Please describe any concerns you have with measure exclusions.**

Submission document: See testing attachment, section 2b2.

Panel Member #1: NONE

Panel Member #2: None

Panel Member #4: In this case the validity of the measures seems more tied to use in a particular type of program (ACO or health plan)

Panel Member #5: Is "10 days after discharge" an exclusion per definition of denominator? Not listed in the exclusions.

Panel Member #6: None.

Panel Member #8: The data regarding measure exclusions is provided and ranges from 7.73% for patients without continuous enrollment in Part A or B during the measurement period to 0.2% for those not at risk for hospitalization at any time during the measurement year. Thus, overall, about 90% of the attributed patients remain in the cohort and the exclusions make sense.

Panel Member #9: No concerns

13. **Please describe any concerns you have regarding the ability to identify meaningful differences in performance.**

Submission document: Testing attachment, section 2b4.

Panel Member # 1: Data was presented from 2012 on admissions among patients with MCCs, which seems out of date. Supporting the ability to identify meaningful differences, the interquartile range for admissions/100 was 62.0-76.0, a relatively wide range, and 19.3 % of ACOs performed worse that the national rate, and 41.2% better.

Panel Member #2: No, I think the measure developer has done a good job explaining the measure's ability to identify meaningful difference.
Panel Member #4: None
Panel Member #6: The risk-standardized measure scores had a median value of 38.6 and mean value of 38.9 (standard deviation +/-4.2) admissions per 100 person-years. The percentiles of the distribution ranged from 23.6 (min) to 53.3 (max) and 28.6 (1st) to 48.6 (99th). Across the 559 ACOs with at least one MCC patient, RSAAR measure scores, including adjustment for the social risk factors of AHRQ SES Index, and physician-specialist density, ranged from 23.6 to 53.3 per 100 person-years, with a median of 38.6 and an IQR of 36.4 to 41.5. This indicates that after adjustment half of Medicare patients with multiple chronic conditions had between 36 and 41 acute admissions in a year. The 10th and 90th percentiles, representing the best and worst performers, had an admission rate of 33.7 and 44.3 respectively, which reflects meaningful deviations from the median.
The MRR value of 1.12 indicates that a patient has a 12% higher admission rate if the patient was attributed to a higher-risk ACO compared with a lower-risk ACO indicating that the impact of quality on the outcome rate is meaningful. Overall, the results suggest that there is substantial room to reduce the number of admissions.
Panel Member # 8: The degree of variability between individual ACO-level risk-standardized acute admission rates (RSAAR) is assessed by determining a median rate ratio (MRR) – the median increase in the rate of an acute unplanned admission if a single patient is attributed to a higher risk ACO compared to a lower risk ACO. From this, the risk-standardized measure scores had a median value of 38.6 and a mean value of 38.9 (SD 4.2) admissions per 100 person-years. A minimum was 23.6 and a maximum was 53.3, with 10th percentile of 33.7, 50th percentile of 38.6, and 90th percentile of 44.3. Thus, there was identifiable meaningful differences in the measure score across ACO's.
Panel Member #9: No concerns
14. **Please describe any concerns you have regarding comparability of results if multiple data sources or methods are specified.**
Submission document: Testing attachment, section 2b5.
Panel Member #1: N/A
Panel Member #2: N/A
Panel Member #4: None
Panel Member #5: The MIF form states that there are 114 ACOs (item 1b.2); the Testing form states 559 ACOs (item 1.6). Which is correct for the analytics supporting this measure?
Panel Member #6: N/A
Panel Member #8: Not applicable
15. **Please describe any concerns you have regarding missing data.**
Submission document: Testing attachment, section 2b6.
Panel Member # 1: NONE
Panel Member #2: The implication of potential missing data has been well-described, and I have no further concern.
Panel Member #4: None.
Panel Member #6: None.
Panel Member #8: Missing data frequencies are provided, and 0.38% had missing data for one or both social risk factors, defined by zip codes.
Panel Member #9: No concerns
16. **Risk Adjustment**
16a. **Risk-adjustment method** ☐ **None** ☒ **Statistical model** ☐ **Stratification**
16b. **If not risk-adjusted, is this supported by either a conceptual rationale or empirical analyses?**
☒ Yes ☐ No ☒ Not applicable
16c. **Social risk adjustment:**
16c.1 Are social risk factors included in risk model? ☒ Yes ☐ No ☐ Not applicable
Panel Member #1: AHRQ SES Index and physician-specialty density.
Panel Member #5: ZIP code level—Area Deprivation Index (ADI) from Census data (2009-2013)

16c.2 Conceptual rationale for social risk factors included? ☒ Yes ☐ No

16c.3 Is there a conceptual relationship between potential social risk factor variables and the measure focus? ☒ Yes ☐ No

16d. **Risk adjustment summary:**

16d.1 All of the risk-adjustment variables present at the start of care? ☒ Yes ☐ No

16d.2 If factors not present at the start of care, do you agree with the rationale provided for inclusion? ☒ Yes ☐ No

Panel Member # 1: N/A

16d.3 Is the risk adjustment approach appropriately developed and assessed? ☒ Yes ☐ No

16d.4 Do analyses indicate acceptable results (e.g., acceptable discrimination and calibration) ☒ Yes ☐ No

16d.5. Appropriate risk-adjustment strategy included in the measure? ☒ Yes ☐ No

Panel Member #5: See previous comments

16e**. Assess the risk-adjustment approach**

Panel Member #1: Basic variation of standard CMS risk model, with variables for 9 conditions that trigger inclusion in the category, HCC comorbidities and other variable. Model explains 11.1% of variance, low but consistent with other risk adjustment models that have been approved. Risk deciles show a well calibrated model, although the presentation could have been clearer. While inclusion of SRF do not change results substantially from multivariate model adjusted for demographic and clinical variables, decision was made to include two SRF variables.

Panel Member #2: I am not sure if the deviance of R-squared of 11% good enough.

Panel Member #4: Social risk factors are well conceptualized

Panel Member #5: In the MIF form the Developers state "ACOs serving many low SES patients more often perform worse than the national rate compared with ACOs serving few low SES patients. This was true using either the AHRQ SES index (37.9% vs. 6.9%, respectively) or Medicaid dual-eligibility status (39.3% vs. 3.6%, respectively) as an indicator of patients' SES." and then state "We did not adjust the measure for patient-level SES. Conceptually, ACOs should and do influence a broad range of patient and community-level factors that can mitigate the risk of admission associated with low SES, and we do not want to adjust for modifiable factors." Their own results show that SES should be a risk factor in the model and their rationale for excluding SES is fundamentally flawed. Patient SES is not something that ACO's have control over just as ACOs have no control over the patient's pre-existing condition—and inclusion in the prediction model used to risk adjust the measure is required of both sets of variables.

Panel Member #6: The final patient-level risk-adjustment model included 49 variables (47 demographic and clinical variables and 2 social risk factors). They used a negative binomial regression model with linear variance (NB-1) to risk adjust the measure.

Social risk factors included low AHRQ SES index and low physician-specialist density. **It is interesting to note that the rationale for inclusion is somewhat in conflict for the rationale NOT to include social risk factors in all of the readmission measures from same developer.** The developers indicate that CMS included these variables in the MIPS MCC measure because **clinicians working in the community have a limited ability to influence these community-based contextual factors that affect admission risk. The ACO MCC conceptual model *acknowledges that low SES influences admission risk*. This is in direct conflict to the set of 30-day condition specific readmissions measures submitted by this developer measured at the hospital level. Is it true that hospitals have ability to influence community-based contextual factors but ACOs do not?**

I would also note that in the multivariate model, dual eligible status had an even stronger relationship to admissions (1.18) than the low SES (1.06) and low specialist density (1.03) but was NOT included in the final model.

The model was evaluated using deviance R-squared, which was 0.111 indicating the model explains 11.1% of variation in admission rates. This is NOT indication of a very strong model.

Panel Member # 8: The risk adjustment model utilized 49 variables, demographic (age), 46 clinical (diagnosis groupers and functional status), and 2 social risk variables (SES index and specialist density). A

deviance R-squared was utilized for assessing the model performance. Predicted to measured number of admissions performed well across four quartiles.

Panel Member #9: Social risk factors assessed with published literature and statistical analysis. I have no concerns

***For cost/resource use measures ONLY*:**

17. **Are the specifications in alignment with the stated measure intent?**

☐ Yes ☐ Somewhat ☐ No (If "Somewhat" or "No", please explain)

18. **Describe any concerns of threats to validity related to attribution, the costing approach, carve outs, or truncation (approach to outliers):**

VALIDITY: TESTING

19. **Validity testing level: ☒ Measure score ☒ Data element ☐ Both**

20. **Method of establishing validity of the measure score:**

☒ Face validity

☒ Empirical validity testing of the measure score

☐ N/A (score-level testing not conducted)

21. **Assess the method(s) for establishing validity**

Submission document: Testing attachment, section 2b2.2

Panel Member # 1: Face validity via feedback and comments received from TEP and public. Association with selected measures of ACO performance, notably risk standardized all condition readmission (corr=0.42) and diabetes hemoglobin poor control (corr 0.18). No substantial correlation found with timeliness of appointments, care and information, access to specialists or controlling high blood pressure.

Panel Member #2: The testing form did not check face validity option (2b1.1) though they have described how do achieved face validity of the measure. I am guessing that the face validity that the developer describes was for the initial approval of the measure, and therefore I am not evaluating it.

The arguments that the developer marshalled to establish the validity of the outcome measure is convincing.

For establishing empirical validity, the developer identified the correlation with 5 measures out of 23 MSSP measures, along with the hypothesized direction and extent of the correlation (see Table 2)

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

Panel Member #4: I think there was a credible attempt to demonstrate construct validity with the a priori identification of related measures and hypothesized relationships.

Panel Member #6: Validity was assessed by external stakeholders and experts, as well as a technical expert panel (TEP). Empirical validity testing 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.

Panel Member # 8: For face validity, a TEP was convened an provided expert panel input as to the conditions, groupings, modeling. Public commenting was also requested.

Empirical testing compared performance of the ACO MCC score correlated to other ACO measures that assess quality. Specifically these were two CAHPS measures, Risk Standardized All Condition Readmission, Diabetes Poor Control, and High Blood Pressure Control, each with positive or negative correlations. Spearman Correlations Coefficients were respectively 0.09, -0.01, 0.42, 0.18, and -0.07. Thus, the strongest correlation was with the Risk Standardized All Condition Readmission measure.

Panel Member # 9: Thorough vetting process with TEP, consultations and public comments. Correlation with similar ACO measures performed.

22. **Assess the results(s) for establishing validity**

Submission document: Testing attachment, section 2b2.3

Panel Member #1: Face validity via feedback and comments received from TEP and public appears high. Association with selected measures of ACO performance, notably risk standardized all condition readmission (corr=0.42) and diabetes hemoglobin poor control (corr 0.18). No substantial correlation found with timeliness of appointments, care and information, access to specialists or controlling high blood pressure.

Panel Member #2: The empirical validity of the measure is supported through the expected correlations of the ACO MCC measure with other outcome and clinical quality measures [Risk-Standardized All-condition Readmission; Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%)] that have overlapping quality domains and overlapping cohorts.

Panel Member #4: Without an explicitly quality construct and demonstration of a construct-outcome relationship the validity rating should never be more than low

Panel Member #6: Developers did NOT assess the face validity of the measure, but consulted TEP and experts during development.

There was little to no correlation between the ACO measure and the CAHPS measures. There was moderate correlation between the readmissions measure (spearman correlation 0.42, p<.001) as expected. There was weak correlation between the diabetes poor control measure (0.18, p<.001) and slightly negative but insignificant correlation with the control of high blood pressure measure (-0.07, p=0.673).

Overall, these results support moderate measure score validity.

Panel Member #8: The empiric validity testing was strongest for one other measure and relatively weak for other clinical measures. Thus, face validity by the TEP and public support remains the strongest single support for validity.

Panel Member #9: Strong positive correlation between the ACO MCC measure and the Risk Standardized, All Condition Readmission measure (ACO 8) demonstrated

23. **Was the method described and appropriate for assessing conceptually and theoretically sound hypothesized relationships?**

Submission document: Testing attachment, section 2b1.

☒ **Yes**

☐ **No**

☐ **Not applicable** (score-level testing was not performed)

24. **Was the method described and appropriate for assessing the accuracy of ALL critical data elements?** *NOTE that data element validation from the literature is acceptable.*

Submission document: *Testing attachment, section 2b1.*

☒ **Yes**

☒ **No**

☒ **Not applicable** (data element testing was not performed)

25. **OVERALL RATING OF VALIDITY taking into account the results and scope of all testing and analysis of potential threats.**

☒ **High** (NOTE: Can be HIGH only if score-level testing has been conducted)

☒ **Moderate** (NOTE: Moderate is the highest eligible rating if score-level testing has NOT been conducted)

☒ **Low** (NOTE: Should rate LOW if you believe that there **are** threats to validity and/or relevant threats to validity were **not assessed OR** if testing methods/results are not adequate)

☐ **Insufficient** (NOTE: For instrument-based measures and some composite measures, testing at both the score level and the data element level **is required**; if not conducted, should rate as INSUFFICIENT.)

26. **Briefly explain rationale for rating of OVERALL RATING OF VALIDITY and any concerns you may have with the developers' approach to demonstrating validity.**

Panel Member # 1: Basic validity is established as face validity and correlation with all condition readmission. Would have expected the risk adjuster to perform better than it did in explaining variation in admissions.

Panel Member #2: My rationale for high validity is based on my notes on #21 and #22 above.
Panel Member #4: The rating of low is based on both the method and the result.
Panel Member #5: Developer demonstrated a poor effort to risk adjust measure for socio-demographic variables to create valid measure score. Additionally, 4 of the 5 "Comparator" measures hypothesized a weak or poor relationship with the measure. Why would you make such comparisons to demonstrate predictive validity? Two measures can be uncorrelated because they have no conceivable relationship to each other (e.g., temperatures in Colorado during August 2020 vs. the number of people killed each month during WWI).
Panel Member #6: The validity test results show moderate validity of the model. The lack of evaluation of face validity is somewhat curious.
Panel Member #7: Rationale for variables included variation in measure score.
TEP held.
…examined whether performance on the ACO MCC measure was correlated with performance on other ACO measures that at least to some extent assess the same domain(s) of quality (i.e., care coordination and management of chronic conditions).
Panel Member #8: Would like to have seen stronger correlations, either positive or negative with other clinical measures. The sole strongest supportive one is the Readmissions Measure at 0.42. This and TEP/public support probably raise the level from low to moderate, but I cannot support a high rating.
Panel Member #9: No concerns with analysis

FOR COMPOSITE MEASURES ONLY: Empirical analyses to support composite construction

27. **What is the level of certainty or confidence that the empirical analysis demonstrates that the component measures add value to the composite and that the aggregation and weighting rules are consistent with the quality construct?**

- ☐ **High**
- ☐ **Moderate**
- ☐ **Low**
- ☐ **Insufficient**

28. **Briefly explain rationale for rating of EMPIRICAL ANALYSES TO SUPPORT COMPOSITE CONSTRUCTION**

ADDITIONAL RECOMMENDATIONS

29. **If you have listed any concerns in this form, do you believe these concerns warrant further discussion by the multi-stakeholder Standing Committee? If so, please list those concerns below.**
Panel Member #6: See comments related to evaluating the risk adjustment findings related to social risk factors.
Panel Member #8: This measure has low reliability across all groups and the importance of size of practice and number of patients is outlined above. Measure should be applied only to those populations. Validity is totally face validity from expert TEP without empirical testing.
Panel Member #9: Given the results in the submission I would only more forward on recommending this as a "trial-use" measure and for practices with 15 or more providers before full endorsement. I'd like to see more convincing evidence that this actually measures quality of care.

Developer Submission

NQF #: 2888

Corresponding Measures:

De.2. Measure Title: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

Co.1.1. Measure Steward: Centers for Medicare & Medicaid Services

De.3. Brief Description of Measure: 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).

1b.1. Developer Rationale: People with MCCs are more likely to be admitted to the hospital than those without chronic conditions or with a single chronic condition. Additionally, they are more likely to visit the emergency department, use post-acute care (such as skilled nursing facilities), and require home health assistance [1]. No quality measures specifically designed for this population exist to assess quality of care or to enable the evaluation of whether current efforts to improve care are successful; this measure is designed to help fill that gap as called for in NQF's "Multiple Chronic Conditions Measurement Framework." [2]

The measure is focused on ACOs because better, coordinated care should lower the risk of hospitalization for this vulnerable population. The measure is designed to illuminate variation in hospital admission rates and incentivize ACOs to develop efficient and coordinated chronic disease management strategies that anticipate and respond to patients' needs and preferences. The measure is also consistent with ACOs' commitment to deliver patient-centered care that fulfills the goals of the Department of Health and Human Services' National Quality Strategy – improving population health, providing better care, and lowering health care costs [3].

The rationale for measuring acute unplanned admissions is to assess the quality of care as experienced by the patient and to drive overall improvements in care quality, coordination, and efficiency that are not specific to certain diseases. Ambulatory care providers can act together to lower patients' risk for a wide range of acute illness requiring admission in several ways:

1. Provide optimal and accessible chronic disease management to reduce catastrophic sequelae of chronic disease. For example:
    a. Support healthy lifestyle behaviors and optimize medical management to minimize the risk for cardiovascular events such as stroke and heart attacks; and
    b. Carefully monitor and act early to address chronic problems that require major interventions if allowed to progress (for example, assessment and treatment of peripheral artery disease in unresolving infections in order to prevent amputation).
2. Anticipate and manage the interactions between chronic conditions. For example:
    a. Closely monitor renal function in patients on diuretic therapy for heart failure and chronic kidney disease;
    b. Minimize polypharmacy to reduce drug-drug and drug-disease interactions; and
    c. Assess and treat depression to improve self-efficacy and self-management of chronic disease.
3. Provide optimal primary prevention of acute illnesses, such as recommended immunizations and screening.
4. Facilitate rapid, effective ambulatory intervention when acute illness does occur, whether related or unrelated to the chronic conditions. For example:

a. Promptly prescribe antibiotics for presumed bacterial pneumonia and diuretic treatment for fluid overload in heart failure;
b. Empower patients to recognize symptoms and to seek timely care; and
c. Create accessible care options for patients (e.g., weekend or evening hours; capacity to deliver intravenous medications).

5. Partner with the government, local businesses, and community organizations to improve support for patients with chronic illness. For example:
   a. Collaborate with home nursing programs;
   b. Partner with local businesses to increase opportunities to engage in healthy lifestyle behaviors; and
   c. Provide outreach and services at senior centers.

A number of studies have shown that improvements in the delivery of health care services for ambulatory patients with MCCs can lower the risk of admission [4-13]. Demonstrated strategies include improving access to and continuity of care, supporting self-care in the home, better coordinating care across providers, and integrating social work, nursing, and medical services.

The goal of this measure is to illuminate variation among ACOs in hospital admission rates for people with MCCs and incentivize ACOs to expand efforts to develop and implement efficient and coordinated chronic disease management strategies that anticipate and respond to patients' needs and preferences. Recent data suggest that ACOs are indeed focused on strategies to reduce hospital admissions and use hospital admissions to evaluate the success of their interventions. A 2018 Annual ACO Survey showed that across all ACO types, top priorities included reducing avoidable emergency department (ED) visits and inpatient admissions, as well as reducing readmissions through better care transitions [14]. In a series of case studies on ACOs, ACOs with palliative care and serious illness programs often judged the outcomes of their programs by evaluating their effect on ED visits and hospital admissions [14]. These findings further support the use of hospital admissions as important outcomes in this setting as they are already widely recognized as signals of quality.

Citations:

1. Centers for Medicare and Medicaid Services. Chronic Conditions Among Medicare Beneficiaries, Chartbook: 2012 Edition. 2012; http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/Downloads/2012Chartbook.pdf. Accessed March 18, 2014.
2. National Quality Forum (NQF). Multiple Chronic Conditions Measurement Framework. 2012; http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227
3. U.S. Department of Health and Human Services. Multiple chronic conditions—A strategic framework: Optimum health and quality of life for individuals with multiple chronic conditions. December 2010; http://www.hhs.gov/ash/initiatives/mcc/mcc_framework.pdf. Accessed March 20, 2014.
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6. Dorr DA, Wilcox AB, Brunker CP, Burdon RE, Donnelly SM. The effect of technology-supported, multidisease care management on the mortality and hospitalization of seniors. U Am Geriatr Soc. 2008;56(12):2195-2202.
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8. Littleford A, Kralik D. Making a difference through integrated community care for older people. Journal of Nursing and Healthcare of Chronic Illness. 2010;2(3):178-186.

9. Bazemore, A., et al. (2018). "Higher Primary Care Physician Continuity is Associated With Lower Costs and Hospitalizations." Ann Fam Med. 16(6): 492-497.
10. O´Malley, A. S., et al. (2019). "New approaches to measuring the comprehensiveness of primary care physicians." Health Serv Res. 54(2): 356-366.
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12. Ruiz S, Snyder LP, Rotondo C, Cross-Barnet C, Colligan EM, Giuriceo K. Innovative Home Visit Models Associated With Reductions In Costs, Hospitalizations, And Emergency Department Use. Health Affairs. 2017;36(3):425-432
13. Edwards ST, Saha S, Prentice JC, Pizer SD. Preventing Hospitalization with Veterans Affairs Home-Based Primary Care: Which Individuals Benefit Most? Journal of the American Geriatrics Society. 2017;65(8):1676-1683
14. Roiland R, Bleser WK, Muhlestein D, Saunders RS. How Are ACOs Prioritizing Palliative Care and Other Serious Illness Strategies? Health Affairs Blog. 2020; published January 7, 2020.

S.4. 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.

S.6. 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.

S.8. Denominator 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.

De.1. Measure Type: Outcome

S.17. Data Source: Claims, Enrollment Data, Other

S.20. Level of Analysis: Other

IF Endorsement Maintenance – Original Endorsement Date: Dec 09, 2016 **Most Recent Endorsement Date:** Dec 09, 2016

IF this measure is included in a composite, NQF Composite#/title:

IF this measure is paired/grouped, NQF#/title:

De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results? Not applicable.

1. Evidence and Performance Gap – Importance to Measure and Report

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. ***Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria.***

1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form

NQF_2888_ACO_MCC_EvidenceAttachment_FINAL.docx

1a.1 *For Maintenance of Endorsement:* Is there new evidence about the measure since the last update/submission?

Do not remove any existing information. If there have been any changes to evidence, the Committee will consider the new evidence. Please use the most current version of the evidence attachment (v7.1). Please use red font to indicate updated evidence.

Yes

1a. Evidence (subcriterion 1a)

Measure Number (*if previously endorsed*)**:** 2888

Measure Title: Accountable Care Organization Risk-Standardized Acute Admission Rate for Patients with Multiple Chronic Conditions

IF the measure is a component in a composite performance measure, provide the title of the Composite Measure here: Not a composite measure

Date of Submission: November 2020

1a.1. This is a measure of: (*should be consistent with type of measure entered in De.1*)

Outcome

☒ Outcome:

☐ Patient-reported outcome (PRO):

PROs include HRQoL/functional status, symptom/symptom burden, experience with care, health-related behaviors. (A PRO-based performance measure is not a survey instrument. Data may be collected using a survey instrument to construct a PRO measure.)

☐ Intermediate clinical outcome (*e.g., lab value*):

☐ Process:

☐ Appropriate use measure:

☐ Structure:

☐ Composite:

1a.2 LOGIC MODEL Diagram or briefly describe the steps between the healthcare structures and processes (e.g., interventions, or services) and the patient's health outcome(s). The relationships in the diagram should be easily understood by general, non-technical audiences. Indicate the structure, process or outcome being measured.

The quality of care for patients with multiple chronic conditions (MCCs) is generally best assessed by examining outcomes rather than care processes [1]. Patients with MCCs vary in the objectives and goals set for their care; for example, people with the same conditions may place different values on alleviating symptoms,

improving function, reducing the risk of acute events, or minimizing drug side effects. Therefore, disease-specific processes or intermediate measures addressed by traditional care measures may not be aligned with patient core preferences. In addition, disease-specific treatments may often be contraindicated in the context of co-existing comorbidities [2]. Moreover, surrogate or intermediate markers of outcomes, such as cholesterol levels, may not have the same relationship to outcomes of importance in patients with MCCs as they do in patients with the single condition [3]. In contrast, outcome measures can focus on endpoints of importance to patients that reflect how the combined care people receive affects their health. Hence, experts have recommended measuring several "universal" outcomes that include health status, functional status, symptom burden, and death in order to evaluate care for patients with MCCs. Researchers have used additional outcomes [2-4], including admission rates, to assess the success of interventions to improve care.

This measure uses the outcome of acute unplanned admissions to assess care quality. We target this adverse event for several reasons. Patients with MCCs are typically frailer and at higher risk for hospitalizations due to, for example, potentially life-threatening exacerbations of their conditions and complications of complex treatment regimens [1, 3]. They may be persistently physiologically stressed due to challenges maintaining adequate circulation, renal function, and respiration. Moreover, depression, dementia, and/or fatigue may contribute to the challenges they face implementing potentially complex care plans designed to maintain their health status, and their disease burden and treatment regimens in turn can affect their mental well-being. As a result, patients with MCCs may experience an increased vulnerability to common causes of admission including pneumonia and other infections, admissions due to exacerbations of their chronic conditions, and admissions related to frailty (for example, due to falls) [5]. Providers can potentially lower the risk of acute admissions in this high-risk population through better coordinated, timelier, and more effective health care. Hence, efforts to redesign care for patients with MCCs have used admission rates as one outcome to evaluate the success of interventions.

Citations:

1. National Quality Forum (NQF). Multiple Chronic Conditions Measurement Framework. 2012; http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227
2. Guiding principles for the care of older adults with multimorbidity: an approach for clinicians: American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. Journal of the American Geriatrics Society. Oct 2012;60(10):E1-E25.
3. Uhlig K, Leff B, Kent D, et al. A Framework for Crafting Clinical Practice Guidelines that are Relevant to the Care and Management of People with Multimorbidity. J GEN INTERN MED. 2014/04/01 2014;29(4):670-679.
4. Tinetti ME, Fried TR, Boyd CM. Designing health care for the most common chronic condition—multimorbidity. JAMA. 2012;307(23):2493-2494.
5. U.S. Department of Health and Human Services. Multiple chronic conditions—A strategic framework: Optimum health and quality of life for individuals with multiple chronic conditions. December 2010; http://www.hhs.gov/ash/initiatives/mcc/mcc_framework.pdf. Accessed June 22, 2020.

1a.3 Value and Meaningfulness: IF this measure is derived from patient report, provide evidence that the target population values the measured ***outcome, process, or structure*** and finds it meaningful. (Describe how and from whom their input was obtained.)

****RESPOND TO ONLY ONE SECTION BELOW -EITHER 1a.2, 1a.3 or 1a.4) ****

1a.2 FOR OUTCOME MEASURES including PATIENT REPORTED OUTCOMES - Provide empirical data demonstrating the relationship between the outcome (or PRO) to at least one healthcare structure, process, intervention, or service.

The rationale for measuring acute unplanned admissions for Accountable Care Organization (ACO) chronic disease patients is that ACOs are established precisely to improve patient-centered care and outcomes for these patients. Providers within an ACO share responsibility for delivering primary preventive services, chronic disease management, and acute care to patients with MCCs. Further, ACOs accept accountability for patient outcomes; providers form ACOs voluntarily and commit to the goals of the ACO program, which include providing better coordinated care and chronic disease management while lowering costs [1]. These program goals are fully aligned with the objective of lowering patients' risk of admission incentivized by the measure [2]. ACOs should be able to lower the risk of acute, unplanned admissions more feasibly than less integrated Medicare fee-for-service providers through strengthening preventive care, delivering better coordinated and more effective chronic disease management, and providing timely ambulatory care for acute exacerbations of chronic disease. ACOs may also need to engage with community organizations and health-related community services to facilitate effective chronic disease management.

A number of studies have shown that improvements in the delivery of health care services for ambulatory patients with MCCs can lower the risk of admission [3-8]. Demonstrated strategies include improving access to and continuity of care, supporting self-care in the home, better coordinating care across providers, and integrating social work, nursing, and medical services.

The goal of this measure is to illuminate variation among ACOs in hospital admission rates for people with MCCs and incentivize ACOs to expand efforts to develop and implement efficient and coordinated chronic disease management strategies that anticipate and respond to patients' needs and preferences. Recent data suggest that ACOs are indeed focused on strategies to reduce hospital admissions and use hospital admissions to evaluate the success of their interventions. A 2018 Annual ACO Survey showed that across all ACO types, top priorities included reducing avoidable emergency department (ED) visits and inpatient admissions, as well as reducing readmissions through better care transitions. In a series of case studies on ACOs, ACOs with palliative care and serious illness programs often judged the outcomes of their programs by evaluating their effect on ED visits and hospital admissions. These findings further support the use of hospital admissions as important outcomes in this setting as they are already widely recognized as signals of quality.

Citations:

1. Centers for Medicare & Medicaid Services (CMS). Accountable Care Organizations (ACOs): General Information. http://innovation.cms.gov/initiatives/aco/. Accessed September 25, 2014.
2. Centers for Medicare & Medicaid Services (CMS). Accountable Care Organizations (ACOs): General Information. http://innovation.cms.gov/initiatives/aco/. Accessed September 25, 2014.
3. Dorr DA, Wilcox AB, Brunker CP, Burdon RE, Donnelly SM. The effect of technology-supported, multidisease care management on the mortality and hospitalization of seniors. Journal of the American Geriatrics Society. Dec 2008;56(12):2195-2202.
4. Levine S, Steinman BA, Attaway K, Jung T, Enguidanos S. Home care program for patients at high risk of hospitalization. American Journal of Managed Care. 2012 Aug 2012;18(8):e269-276.
5. Littleford A, Kralik D. Making a difference through integrated community care for older people. Journal of Nursing and Healthcare of Chronic Illness. 2010;2(3):178-186.

6. Chan CL, You HJ, Huang HT, Ting HW. Using an integrated COC index and multilevel measurements to verify the care outcome of patients with multiple chronic conditions. BMC health services research. 2012 2012;12:405.
7. Sommers LS, Marton KI, Barbaccia JC, Randolph J. Physician, nurse, and social worker collaboration in primary care for chronically ill seniors. Arch Intern Med. Jun 26 2000;160(12):1825-1833.
8. Zhang NJ, Wan TT, Rossiter LF, Murawski MM, Patel UB. Evaluation of chronic disease management on outcomes and cost of care for Medicaid beneficiaries. Health policy (Amsterdam, Netherlands). May 2008;86(2-3):345-354.

1a.3. SYSTEMATIC REVIEW(SR) OF THE EVIDENCE (for INTERMEDIATE OUTCOME, PROCESS, OR STRUCTURE PERFORMANCE MEASURES, INCLUDING THOSE THAT ARE INSTRUMENT-BASED) If the evidence is not based on a systematic review go to section 1a.4) If you wish to include more than one systematic review, add additional tables.

What is the source of the *systematic review of the body of evidence* that supports the performance measure? A systematic review is a scientific investigation that focuses on a specific question and uses explicit, prespecified scientific methods to identify, select, assess, and summarize the findings of similar but separate studies. It may include a quantitative synthesis (meta-analysis), depending on the available data. (IOM)

☐ Clinical Practice Guideline recommendation (with evidence review)

☐ US Preventive Services Task Force Recommendation

☐ Other systematic review and grading of the body of evidence (*e.g., Cochrane Collaboration, AHRQ Evidence Practice Center*)

☐ Other

Systematic Review	Evidence
Source of Systematic Review: • Title • Author • Date • Citation, including page number • URL	*
Quote the guideline or recommendation verbatim about the process, structure or intermediate outcome being measured. If not a guideline, summarize the conclusions from the SR.	*
Grade assigned to the **evidence** associated with the recommendation with the definition of the grade	*
Provide all other grades and definitions from the evidence grading system	*
Grade assigned to the **recommendation** with definition of the grade	*
Provide all other grades and definitions from the recommendation grading system	*

Systematic Review	Evidence
Body of evidence: • Quantity – how many studies? • Quality – what type of studies?	*
Estimates of benefit and consistency across studies	*
What harms were identified?	*
Identify any new studies conducted since the SR. Do the new studies change the conclusions from the SR?	*

*cell intentionally left blank

_____

1a.4 OTHER SOURCE OF EVIDENCE

If source of evidence is NOT from a clinical practice guideline, USPSTF, or systematic review, please describe the evidence on which you are basing the performance measure.

N/A

1a.4.1 Briefly SYNTHESIZE the evidence that supports the measure. A list of references without a summary is not acceptable.

N/A

1a.4.2 What process was used to identify the evidence?

N/A

1a.4.3. Provide the citation(s) for the evidence.

N/A

1b. Performance Gap

Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating:

- considerable variation, or overall less-than-optimal performance, in the quality of care across providers; and/or
- Disparities in care across population groups.

1b.1. Briefly explain the rationale for this measure *(e.g., how the measure will improve the quality of care, the benefits or improvements in quality envisioned by use of this measure)*

If a COMPOSITE *(e.g., combination of component measure scores, all-or-none, any-or-none), SKIP this question and answer the composite questions.*

People with MCCs are more likely to be admitted to the hospital than those without chronic conditions or with a single chronic condition. Additionally, they are more likely to visit the emergency department, use post-acute care (such as skilled nursing facilities), and require home health assistance [1]. No quality measures specifically designed for this population exist to assess quality of care or to enable the evaluation of whether current efforts to improve care are successful; this measure is designed to

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14. Roiland R, Bleser WK, Muhlestein D, Saunders RS. How Are ACOs Prioritizing Palliative Care and Other Serious Illness Strategies? Health Affairs Blog. 2020; published January 7, 2020.

1b.2. Provide performance scores on the measure as specified (*current and over time*) at the specified level of analysis. *(**This is required for maintenance of endorsement**. Include mean, std dev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) This information also will be used to address the sub-criterion on improvement (4b1) under Usability and Use.*

The updated ACO MCC measure that is described in this NQF submission is currently not in use. Below we provide results from the original ACO MCC measure that is in use in the Medicare Shared Savings Program (MSSP).

The number of SSP ACOs and beneficiaries has increased over time. In 2012/2014, there were 220 ACOs who provided care to over 3 million beneficiaries, 2017: 480 ACOs and 9 million beneficiaries, 2020: 517 ACOs and over 11 million beneficiaries.

Performance Year (PY)// ACOs (N)// Average RSAAR// Reconciled ACOs Eligible for Quality Improvement that Significantly Improved on ACO-38 (N/%)

PY15//397//62.92//--

PY16//432//59.81//233 (70.2%)

PY17//480//61.76//92 (24.2%)

PY18//559//59.03//317 (73.4%)

PY19//553//58.13//253 (51.1%)

Range of performance for the updated ACO MCC measure.

The updated ACO MCC measure is not currently in use. Measure testing for this NQF submission for the updated ACO MCC measure used data for performance year 2018. For this performance period, total of 2,515,727 Medicare FFS MCC patients were attributed to 559 ACOs that are part of MSSP. Acute, unplanned hospital admissions were identified using 2018 Medicare FFS institutional inpatient claims. Overall, across ACOs, RSAAR measure scores ranged 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 mean RSAAR and standard deviation were 38.9 ± 4.2 admissions per 100 person-years.

Below shows the range of RSAAR within each decile:

Decile	Range of RSAAR
1	[23.6 - 33.7]
2	(33.7 - 35.7]
3	(35.7 - 36.8]
4	(36.9 - 37.8]
5	(37.8 - 38.6]
6	(38.6 - 39.7]
7	(39.7 - 40.9]
8	(40.9 - 42.2]
9	(42.2 - 44.3]
10	(44.3 - 53.3]

1b.3. If no or limited performance data on the measure as specified is reported in 1b2, then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.

N/A; we provide performance data in 1b.2.

1b.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability. ***(This is required for maintenance of endorsement****. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included.) For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for*

improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b1) under Usability and Use.

The final patient-level model includes two social risk factors: Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) Index (lowest quartile vs. upper three quartiles) and an area-level measure of specialist physician density (lowest quartile vs. upper three quartiles). In the multivariable model that included both of these social risk factors along with the demographic and clinical risk adjusters, we found relatively modest effects for the social risk factor variables. Their rate ratios and 95% confidence intervals were 1.08 (1.07, 1.09) for the AHRQ SES variable, and 1.03 (1.02, 1.04), for the specialist physician density variable.

Because these social risk variables are in the measure's model, below we show the distribution of measure scores stratified by the proportion of patients with dual eligibility, for which the measure is not adjusted.

Distribution of ACO MCC RSAARs by Proportion of Patients with Dual Eligibility

Quartile for proportion of dual-eligible patients

Q1 (0.6%-5.9%); Q2 (5.9%-9.9%); Q3 (10.0%-15.3%); Q4 (15.3%-91.5%)

Number of ACOs: 139//140//140//140

Mean: 36.8//39.5//39.4//39.7

Std Dev: 4.1//3.8//3.6//4.6

Maximum: 48.1 //50.0//53.3//52.3

99th Percentile: 48.1//49.6//48.4//48.6

95th Percentile: 43.4//46.3//44.7//47.1

90th Percentile: 41.5//44.3//43.7//45.8

Upper Quartile: 39.4//41.6//41.9//42.8

Median: 37.0//39.4//39.0//39.2

Lower Quartile: 33.8//37.0//37.0//37.1

10th Percentile: 31.0//35.2//35.1//34.6

5th Percentile: 29.5//33.9//33.8//33.1

1st Percentile: 27.6//30.6//31.9//26.2

Minimum: 26.2//29.0//31.5//23.6

For more information about the testing of disparities data, please review section 1.8 and section 2b3.3 in the testing attachment.

1b.5. If no or limited data on disparities from the measure as specified is reported in 1b.4, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations. Not necessary if performance data provided in 1b.4

Please see testing described in section 1b.4 above and in sections 1.8 and 2b3.3 of the testing attachment.

2. Reliability and Validity—Scientific Acceptability of Measure Properties

Extent to which the measure, **as specified**, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. ***Measures must be judged to meet the sub criteria for both reliability and validity to pass this criterion and be evaluated against the remaining criteria.***

2a.1. Specifications The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability. eMeasures should be specified in the Health Quality Measures Format (HQMF) and the Quality Data Model (QDM).

De.5. Subject/Topic Area *(check all the areas that apply):*

Behavioral Health : Depression, Cardiovascular, Cardiovascular : Arrythmia, Cardiovascular : Congestive Heart Failure, Cardiovascular : Coronary Artery Disease, Cardiovascular : Coronary Artery Disease (AMI), Neurology, Neurology : Stroke/Transient Ischemic Attack (TIA), Renal : Chronic Kidney Disease (CKD), Respiratory : Asthma, Respiratory : Chronic Obstructive Pulmonary Disease (COPD)

De.6. Non-Condition Specific*(check all the areas that apply):*

Care Coordination, Care Coordination : Readmissions, Health and Functional Status : Change, Health and Functional Status : Nutrition, Health and Functional Status : Total Health, Immunization, Primary Prevention, Safety, Safety : Complications, Safety : Medication, Safety : Overuse

De.7. Target Population Category *(Check all the populations for which the measure is specified and tested if any):*

Elderly, Populations at Risk : Individuals with multiple chronic conditions

S.1. Measure-specific Web Page *(Provide a URL link to a web page specific for this measure that contains current detailed specifications including code lists, risk model details, and supplemental materials. Do not enter a URL linking to a home page or to general information.)*

Not applicable.

S.2a. ***If this is an eMeasure***, HQMF specifications must be attached. Attach the zipped output from the eMeasure authoring tool (MAT) - if the MAT was not used, contact staff. (Use the specification fields in this online form for the plain-language description of the specifications)

This is not an eMeasure **Attachment:**

S.2b. Data Dictionary, Code Table, or Value Sets *(and risk model codes and coefficients when applicable) must be attached. (Excel or csv file in the suggested format preferred - if not, contact staff)*

Attachment **:** NQF_ACO_MCC_DataDictionary_07.09.20.xlsx

S.2c. Is this an instrument-based measure (i.e., data collected via instruments, surveys, tools, questionnaires, scales, etc.)? Attach copy of instrument if available.

No, this is not an instrument-based measure **Attachment:**

S.2d. Is this an instrument-based measure (i.e., data collected via instruments, surveys, tools, questionnaires, scales, etc.)? Attach copy of instrument if available.

Not an instrument-based measure

S.3.1. ***For maintenance of endorsement:*** Are there changes to the specifications since the last updates/submission. If yes, update the specifications for S1-2 and S4-22 and explain reasons for the changes in S3.2.

Yes

S.3.2. ***For maintenance of endorsement,*** please briefly describe any important changes to the measure specifications since last measure update and explain the reasons.

Since initial endorsement of the Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions measure (hereafter referred to as the "original ACO MCC measure"), we have made several changes, including updating the cohort of patients to include diabetes as a qualifying condition, narrowing the outcome, and adding frailty and social risk factors to the risk adjustment model. (In this document we refer to the updated measure submitted for endorsement maintenance as the "updated ACO MCC measure." The details of these changes are outlined below. Note also that these changes to the measure were made to align the updated ACO MCC measure (the version submitted here for endorsement maintenance) with the analogous measure that is attributed to clinician-groups in the Merit-Based Incentive Payment System (MIPS), "Clinician Group Risk-standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System," (hereafter referred to as the MIPS MCC measure), which was submitted for initial NQF endorsement in this same cycle.

Below we provide the details of the updates that were made to the original ACO MCC measure:

1. Cohort: We added diabetes as a cohort-qualifying condition.

Rationale: The specific list of chronic conditions for the updated ACO MCC measure, except for diabetes, is the same as the original ACO MCC measure, and has been vetted nationally and published in the literature. [1] In brief, it reflects the chronic conditions that, in combination, put patients at high risk of admission. In adapting the original ACO measure for the MIPS setting, we added diabetes as a cohort-qualifying condition based on input from our MIPS MCC TEP and further guidance from CMS. The inclusion of diabetes acknowledges the complexity that diabetes introduces to caring for patients with MCCs. We then applied this update to the original ACO MCC measure, to align the ACO and MIPS measures.

2. Outcome: We narrowed the outcome to focus on admissions where risk can be reduced by providing high-quality ambulatory care.

Rationale: Not all types of admissions reflect the quality of care being provided to patients with MCCs. A key consideration in re-defining the outcome was focusing on admissions where risk can be reduced by providing high-quality care. In narrowing the outcome, the goal was to include an easily explained, consensus-based, actionable subset of admissions that can be influenced by outpatient care. For example, admissions related to complications of procedures or surgeries and admissions related to accidents or injuries were excluded. See Section S.5 for details on the outcome definition.

3. Risk-adjustment: We added novel frailty risk variables and social risk factors to the risk-adjustment model for the MIPS measure, and then applied the model to the updated ACO MCC measure.

Rationale: CMS wanted to align the ACO MCC and MIPS MCC measures.

Citations

[1] Drye EE, Altaf FK, Lipska KJ, et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018;56(2):19-201

S.4. Numerator Statement *(Brief, narrative description of the measure focus or what is being measured about the target population, i.e., cases from the target population with the target process, condition, event, or outcome) DO NOT include the rationale for the measure.*

***IF an OUTCOME MEASURE**, state the outcome being measured. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).*

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.

S.5. Numerator Details *(All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)*

***IF an OUTCOME MEASURE,** describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).*

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.

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 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
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.

S.6. Denominator Statement *(Brief, narrative description of the target population being measured)*

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.

S.7. Denominator Details *(All information required to identify and calculate the target population/denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)*

***IF an OUTCOME MEASURE**, describe how the target population is identified. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).*

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),
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. Drye EE, Altaf FK, Lipska KJ et al. Defining Multiple Chronic Conditions for Quality Measurement. Med Care. 2018; 56(2):193-201.

S.8. Denominator Exclusions *(Brief narrative description of exclusions from the target population)*

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.

S.9. Denominator Exclusion Details *(All information required to identify and calculate exclusions from the denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)*

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.

S.10. Stratification Information *(Provide all information required to stratify the measure results, if necessary, including the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format with at S.2b.)*

Not applicable. This measure is not stratified.

S.11. Risk Adjustment Type (Select type. Provide specifications for risk stratification in measure testing attachment)

Statistical risk model

If other:

S.12. Type of score:

Rate/proportion

If other:

S.13. Interpretation of Score *(Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)*

Better quality = Lower score

S.14. Calculation Algorithm/Measure Logic (*Diagram or describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period for data, aggregating data; risk adjustment; etc.)*

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.

S.15. Sampling *(If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.)*

IF an instrument-based performance measure (e.g., PRO-PM), identify whether (and how) proxy responses are allowed.

This is not based on a sample or survey.

S.16. Survey/Patient-reported data *(If measure is based on a survey or instrument, provide instructions for data collection and guidance on minimum response rate.)*

Specify calculation of response rates to be reported with performance measure results.

This is not based on a sample or survey.

S.17. Data Source *(Check ONLY the sources for which the measure is SPECIFIED AND TESTED).*

If other, please describe in S.18.

Claims, Enrollment Data, Other

S.18. Data Source or Collection Instrument *(Identify the specific data source/data collection instrument (e.g. name of database, clinical registry, collection instrument, etc., and describe how data are collected.)*

IF instrument-based, identify the specific instrument(s) and standard methods, modes, and languages of administration.

Medicare administrative claims and enrollment data from calendar years 2017 and 2018, 2013-2017 American Community Survey, and 2017-2018 Area Health Resource File.

S.19. Data Source or Collection Instrument *(available at measure-specific Web page URL identified in S.1 OR in attached appendix at A.1)*

No data collection instrument provided

S.20. Level of Analysis *(Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED)*

Other

S.21. Care Setting *(Check ONLY the settings for which the measure is SPECIFIED AND TESTED)*

Outpatient Services

If other:

S.22. *COMPOSITE Performance Measure* - Additional Specifications *(Use this section as needed for aggregation and weighting rules, or calculation of individual performance measures if not individually endorsed.)*

N/A; this measure is not a composite.

2. Validity – See attached Measure Testing Submission Form

NQF_2888_ACO_MCC_TestingForm_081920_FINAL2A-637418329210039654.docx

2.1 *For maintenance of endorsement*

Reliability testing: If testing of reliability of the measure score was not presented in prior submission(s), has reliability testing of the measure score been conducted? If yes, please provide results in the Testing attachment. Please use the most current version of the testing attachment (v7.1). Include information on all testing conducted (prior testing as well as any new testing); use red font to indicate updated testing.

Yes

2.2 *For maintenance of endorsement*

Has additional empirical validity testing of the measure score been conducted? If yes, please provide results in the Testing attachment. Please use the most current version of the testing attachment (v7.1). Include information on all testing conducted (prior testing as well as any new testing); use red font to indicate updated testing.

Yes

2.3 *For maintenance of endorsement*

Risk adjustment: For outcome, resource use, cost, and some process measures, risk-adjustment that includes social risk factors is not prohibited at present. Please update sections 1.8, 2a2, 2b1,2b4.3 and 2b5 in the Testing attachment and S.140 and S.11 in the online submission form. NOTE: These sections must be updated even if social risk factors are not included in the risk-adjustment strategy. You MUST use the most current version of the Testing Attachment (v7.1) -- older versions of the form will not have all required questions.

Yes - Updated information is included

Measure Testing (subcriteria 2a2, 2b1-2b6)

Measure Number (*if previously endorsed*)**:** 2888
Measure Title: Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions
Date of Submission: **11/6/2020**

Type of Measure:

Measure	Measure (continued)
☒ Outcome (*including PRO-PM*)	☐ Composite – *STOP – use composite testing form*
☐ Intermediate Clinical Outcome	☐ Cost/resource
☐ Process *(including Appropriate Use)*	☐ Efficiency
☐ Structure	*

*cell intentionally left blank

1. DATA/SAMPLE USED FOR *ALL* TESTING OF THIS MEASURE

*Often the same data are used for all aspects of measure testing. In an effort to eliminate duplication, the first five questions apply to all measure testing. **If there are differences by aspect of testing**, (e.g., reliability vs. validity) be sure to indicate the specific differences in question 1.7.*

1.1. What type of data was used for testing? (*Check all the sources of data identified in the measure specifications and data used for testing the measure. Testing must be provided for **all** the sources of data specified and intended for measure implementation. **If different data sources are used for the numerator and denominator, indicate N [numerator] or D [denominator] after the checkbox.***)

Measure Specified to Use Data From: (*must be consistent with data sources entered in S.17*)	Measure Tested with Data From:
☐ abstracted from paper record	☐ abstracted from paper record
☒ claims	☒ claims
☐ registry	☐ registry
☐ abstracted from electronic health record	☐ abstracted from electronic health record
☐ eMeasure (HQMF) implemented in EHRs	☐ eMeasure (HQMF) implemented in EHRs
☒ other: Medicare Enrollment Database (EDB), Medicare Fee-for-Service (FFS) administrative claims data (Parts A and B), Medicare FFS non-institutional carrier claims, Durable Medical Equipment (DME) claims; American Community Survey (ACS); Area Health Resources File (AHRF).	☒ other: Medicare Enrollment Database (EDB), Medicare Fee-for-Service (FFS) administrative claims data (Parts A and B), Medicare FFS non-institutional carrier claims, Durable Medical Equipment (DME) claims; American Community Survey (ACS); Area Health Resources File (AHRF).

1.2. If an existing dataset was used, identify the specific dataset (*the dataset used for testing must be consistent with the measure specifications for target population and healthcare entities being measured; e.g., Medicare Part A claims, Medicaid claims, other commercial insurance, nursing home MDS, home health OASIS, clinical registry*).

[Note to NQF staff: Please note that almost all of the information in this testing attachment has been updated for endorsement maintenance, therefore we have not used red text to indicate new content.]

The datasets used for the updates to the measure and testing for endorsement maintenance were:

Medicare Fee-for-Service (FFS) administrative claims data (Parts A and B) and the Medicare Enrollment Database (EDB) from calendar year (CY) 2018, as well as additional datasets specified below.

1. Datasets used to define the cohort:

The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for CY 2018 were obtained from the CMS Medicare EDB and used to define cohort eligibility.

2. Datasets used to capture the outcome:

We assessed provider performance in CY 2018 (referred to as the measurement year). The outcome of acute, unplanned hospital admissions was identified using 2018 Medicare FFS institutional inpatient claims. Information on skilled nursing facility (SNF) and acute rehabilitation facility stays as well as hospice entry, which factor into the outcome definition, was obtained using CMS's Integrated Data Repository (IDR), and Medicare Enrollment Database (EDB), respectively. Information on prior year's visit to the attributed ACO, used in determining whether to exclude some admissions in the measurement year, was obtained from 2017 Medicare FFS non-institutional carrier claims.

3. Datasets used for attribution:

Outpatient Evaluation and Management (E&M) visits during the measurement year, identified using the 2018 Medicare FFS non-institutional carrier claims, were used to attribute patients to providers.

4. Datasets used to identify risk adjustment factors:
    - Clinical comorbidities: 2017 Medicare FFS institutional inpatient and outpatient claims, and non-institutional carrier claims.
    - Frailty indicators: 2017 durable medical equipment (DME) claims.
    - Original reason for Medicare entitlement: Medicare EDB.

- Social risk factors: The social risk factors for analysis and the data sources used to define them were as follows:
    1) Medicare/Medicaid dual-eligibility status: 2017-2018 State Reported Dual Eligible Status Code in the Medicare EDB.
    2) Agency for Healthcare Research Quality (AHRQ) Socioeconomic Status (SES) Index: 2013-2017 American Community Survey (ACS).
    3) Rural residence: 2014 United States Department of Agriculture Economic Research Service.
    4) Primary care provider (PCP) and physician-specialist density variables: 2018-2019 Area Health Resources File (AHRF).

1.3. What are the dates of the data used in testing?

The dates of the data vary by testing type. See Section 1.7 for details.

1.4. What levels of analysis were tested? (*testing must be provided for **all** the levels specified and intended for measure implementation, e.g., individual clinician, hospital, health plan*)

Measure Specified to Measure Performance of: (*must be consistent with levels entered in item S.20*)	**Measure Tested at Level of:**
☐ individual clinician	☐ individual clinician
☐ group/practice	☐ group/practice
☐ hospital/facility/agency	☐ hospital/facility/agency
☐ health plan	☐ health plan
☒ other: Accountable Care Organization	☒ other: Accountable Care Organization

1.5. How many and which *measured entities* were included in the testing and analysis (by level of analysis and data source)? (*identify the number and descriptive characteristics of measured entities included in the analysis (e.g., size, location, type); if a sample was used, describe how entities were selected for inclusion in the sample*)

Accountable Care Organizations (ACOs) in CMS's Medicare Shared Savings Program (MSSP) were the measured entities. The number of measured entities was 559 MSSP ACOs.

1.6. How many and which *patients* were included in the testing and analysis (by level of analysis and data source)? (*identify the number and descriptive characteristics of patients included in the analysis (e.g., age, sex, race, diagnosis); if a sample was used, describe how patients were selected for inclusion in the sample*)

There were 2,515,727 patients with MCCs attributed to the 559 MSSP ACOs. 56.2% of the patients were female; the mean age was 78 years.

1.7. If there are differences in the data or sample used for different aspects of testing (e.g., reliability, validity, exclusions, risk adjustment), identify how the data or sample are different for each aspect of testing reported below.

Not applicable. We used one dataset for endorsement maintenance testing.

1.8 What were the social risk factors that were available and analyzed? For example, patient-reported data (e.g., income, education, language), proxy variables when social risk data are not collected from each patient (e.g. census tract), or patient community characteristics (e.g. percent vacant housing, crime rate) which do not have to be a proxy for patient-level data.

The ACO-level measure outlined in this application, Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions (hereafter referred to as the "ACO MCC measure"), has been re-specified to align with CMS's analogous measure, "Clinician Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System"

(hereafter referred to as the "MIPS MCC measure") developed for CMS's QPP. The MIPS MCC measure has been submitted for initial endorsement in the same cycle as this ACO MCC measure.

CMS aligned the MIPS and ACO measures in all aspects (except for attribution where the ACO measure attributes patients to ACOs in the MSSP program, and the MIPS measure attributes patients to eligible MIPS clinician groups) and therefore social risk factor adjustment for the ACO measure is based on the conceptual model and testing results of the MIPS measure. Accordingly, below we show the risk factors that were used for the MIPS MCC conceptual model and testing. The ACO-level measure was tested with the social risk factors that were retained in the MIPS MCC final measure specifications (AHRQ SES Index and physician-specialist density) consistent with CMS's decision to harmonize the measures. The five social risk factors were:

1. Medicare-Medicaid dual-eligibility status

Direct measures of Medicare beneficiaries' socioeconomic status (SES) are not available. We included the readily available and widely used dual-eligibility status variable as it is a marker of low income and assets.

2. Agency for Healthcare Research and Quality (AHRQ) SES Index

The AHRQ SES Index is a widely used variable that summarizes area-level measures of employment, income, education, and housing. Each of the index components is available at the census block level, which we then used to link to patient's residence using a 9-digit ZIP code. Census variables were found in the American Community Survey. The AHRQ SES index score summarizes the information from the following variables:

percentage of people in the labor force who are unemployed,

percentage of people living below poverty level,

median household income,

median value of owner-occupied dwellings,

percentage of people ≥25 years of age with less than a 12th grade education,

percentage of people ≥25 years of age completing ≥4 years of college, and

percentage of households that average ≥1 people per room.

3. Place of residence (rurality)

We categorized beneficiaries' place of residence in terms of rurality, given its implications for timely receipt of care and concerns that individuals in more rural areas may suffer delays due to longer travel distance and time and relative lack of providers.

4-5. Provider density

To more fully and directly characterize access to care, we additionally included two measures of provider density:

1) PCP density and
2) physician-specialist density.

For the ACO MCC testing, we used AHRQ SES Index and physician-specialist density, i.e., the two social risk factors that were retained in the final model for the MIPS MCC measure.

2a2. RELIABILITY TESTING

***Note**: If accuracy/correctness (validity) of data elements was empirically tested, separate reliability testing of data elements is not required – in 2a2.1 check critical data elements; in 2a2.2 enter "see section 2b2 for validity testing of data elements"; and skip 2a2.3 and 2a2.4.*

2a2.1. What level of reliability testing was conducted? (*may be one or both levels*)

☐ **Critical data elements used in the measure** (*e.g., inter-abstractor reliability; data element reliability must address ALL critical data elements*)

☒ **Performance measure score** (e.g., *signal-to-noise analysis*)

2a2.2. For each level checked above, describe the method of reliability testing and what it tests (*describe the steps—do not just name a method; what type of error does it test; what statistical analysis was used*)

Measure Score Reliability

We considered signal-to-noise analysis as a measure of reliability when evaluating the ACO MCC admission measure. The variation between entities ('signal') comprises the total variation ('noise' and 'signal') in the outcome. This is because the reliability of any one ACO's measure score will vary depending on the number of patients. ACOs with higher volume will tend to have more reliable scores, while those with lower volume will tend to have less reliable scores. We used the formula for signal-to-noise reliability presented by Adams et al. and the formula for intraclass correlation coefficient (ICC) presented by Nakagawa et al. to calculate ACO-level reliability scores. [1,2] To estimate the overall signal and noise, we first calculated the ICC for ACO j using the estimates of between-entity variance 2, dispersion parameter , and mean of outcome , from a hierarchical generalized linear model (HGLM). The formula appropriate for the NB-1 model is ICCj = 2/(2 + ln(1+/). We then used the equation:

Rj = njICCj/(1+(nj-1)ICCj)

where nj is the number of observations for each entity, to calculate the reliability of each entity measurement. Rj can range from 0 (less than chance agreement) to 1.0 (perfect agreement).

Citations

1. Adams JL, Mehrotra A, Thomas JW, McGlynn EA. Physician Cost Profiling — Reliability and Risk of Misclassification. New England Journal of Medicine. 2010;362(11):1014-1021.
2. Nakagawa S, Johnson PCD, Schielzeth H. The coefficient of determination R(2) and intra-class correlation coefficient from generalized linear mixed-effects models revisited and expanded. J R Soc Interface. 2017;14(134).

2a2.3. For each level of testing checked above, what were the statistical results from reliability testing? (e.*g., percent agreement and kappa for the critical data elements; distribution of reliability statistics from a signal-to-noise analysis*)

Measure Score Reliability

The median signal-to-noise reliability score was 0.96 for all MSSP ACOs with at least one attributed MCC patient (n=559) (Interquartile Range [IQR]: 0.94-0.98). Table 1 shows the distribution of the signal-to-noise reliability results.

Table 1: Signal to Noise reliability for the ACO-MCC measure

Providers	N	Mean	Std Dev	Minimum	Median	IQR	Maximum
All ACOs with at least one MCC patient	559	0.95	0.05	0.12	0.96	0.94-0.98	0.99

2a2.4 What is your interpretation of the results in terms of demonstrating reliability? (i.*e., what do the results mean and what are the norms for the test conducted?*)

Calculated using 1-year of data, the median measure score reliability was 0.96 for ACOs with at least one MCC patient. According to established standards for quality measures, we consider these results to show high reliability.

Citations

Adams JL, Mehrotra A, Thomas JW, McGlynn EA. Physician Cost Profiling — Reliability and Risk of Misclassification. New England Journal of Medicine. 2010;362(11):1014-1021.

Adams, John L., Ateev Mehrotra, and Elizabeth A. McGlynn, Estimating Reliability and Misclassification in Physician Profiling. Santa Monica, CA: RAND Corporation, 2010.
https://www.rand.org/pubs/technical_reports/TR863.html

2b1. VALIDITY TESTING

2b1.1. What level of validity testing was conducted? (*may be one or both levels*)

☐ **Critical data elements** (*data element validity must address ALL critical data elements*)

☒ **Performance measure score**

☒ **Empirical validity testing**

☐ **Systematic assessment of face validity of *performance measure score* as an indicator** of quality or resource use (*i.e., is an accurate reflection of performance on quality or resource use and can distinguish good from poor performance*)

2b1.2. For each level of testing checked above, describe the method of validity testing and what it tests (*describe the steps—do not just name a method; what was tested, e.g., accuracy of data elements compared to authoritative source, relationship to another measure as expected; what statistical analysis was used)*

Validity as Assessed by External Groups and Technical Expert Panel

Throughout measure development, we obtained expert and stakeholder input through: involving our in-house experts in clinical management of patients with multiple chronic conditions, statistical modeling, healthcare disparities, and healthcare policy; consulting outside leading experts on care for patients with MCCs; consulting our national TEP; and holding a 30-day public comment period.

In alignment with the CMS Measure Management System, we formally convened the TEP to advise on this measure and two related ACO measures under development for ambulatory patients with diabetes and heart failure. To convene the TEP, we released a public call for nominations; CMS selected individuals to represent a range of perspectives including clinicians, patients, and individuals with experience in quality improvement, performance measurement, and healthcare disparities. We held four structured TEP conference calls consisting of presentation of key issues, our proposed approach, and relevant data, followed by open discussion among TEP members.

We also obtained input from two leading experts in designing the cohort: Dr. Cynthia Boyd, Associate Professor of Medicine at Johns Hopkins Bloomberg School of Public Health; and Dr. Mary Tinetti, Professor of Medicine (Geriatrics) at Yale University School of Medicine.

Finally, we held a public comment period. Comments from several national stakeholder groups and several individuals generally supported the cohort definition and the use of admission as an outcome.

List of TEP Members

1. Lawrence M. Becker, BS, Xerox Corporation (Director, Strategic Partnerships, Alliances and Analytics); Rochester, NY
2. Alex Blum, MD, MPH, Evergreen Health Cooperative (Chief Medical Officer); Baltimore, MD
3. Sanjay Doddamani, MD, Geisinger Health System (System-wide Chief of Advanced Cardiac Disease – Heart Failure); Danville, PA
4. Kevin Fiscella, MD, MPH, University of Rochester Medical Center (Professor of Family Medicine); Rochester, NY
5. Elbert Huang, MD, MPH, University of Chicago (Associate Professor of Medicine, Director of the Center for Translational and Policy Research of Chronic Diseases, and Associate Director of the Chicago Center for Diabetes Translation Research); Chicago, IL
6. Bruce Leff, MD, Johns Hopkins University School of Medicine (Professor of Medicine, Division of Geriatric Medicine); The Johns Hopkins University Bloomberg School of Public Health (Faculty, Health Services Research Development Center and Lipitz Center for Integrated Health Care); Baltimore, MD
7. Andy Miller, MD, MPH, Healthcare Quality Strategies, Inc. (Medical Director); East Brunswick, NJ; Colorado Foundation for Medical Care (CMO, Integrating Care for Populations & Communities National Coordinating Center); Englewood, CO

8. Ami Parekh, MD, JD, University of California, San Francisco (Medical Director for Health System Innovation); San Francisco, CA
9. Christine Ritchie, MD, University of California, San Francisco (Professor of Medicine, Division of Geriatrics); San Francisco, CA
10. Two patient representatives.

Empirical Validity Testing of the Measure Score

We examined whether performance on the ACO MCC measure was correlated with performance on other ACO measures that at least to some extent assess the same domain(s) of quality (i.e., care coordination and management of chronic conditions).

Medicare Shared Savings Program Measures

To identify measures assessing an overlapping quality domain, we reviewed all measures that are currently in use (for CY2020 Payment Determination) in the Medicare Shared Savings Program (MSSP).

Of the 23 measures in the MSSP program that are NQF-endorsed, we identified 5 measures that we hypothesized would be correlated to the ACO MCC measure:

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

A 6th measure that we hypothesized would also be correlated, Ambulatory Sensitive Condition Acute Composite (AHRQ Prevention Quality Indicator (PQI) #91), does not yet have publicly available data for comparison, and it is not currently NQF endorsed.

Table 2 summarizes the hypothesized strength and direction of the relationship between the ACO MCC measure and the comparator measure; a narrative below Table 2 explains our rationale behind each hypothesis.

Table 2: ACO MCC Validation – Comparator measures and hypothesized strength and direction of relationship

MSSP Program Measure	Hypothesized strength of relationship	Direction of relationship
ACO1 - CAHPS: Getting Timely Care, Appointments, and Information	Very weak to none	Negative (i.e., higher score on ACO1 would be correlated with fewer admissions)
ACO4 - CAHPS: Access to Specialists	Very weak to none	Negative
ACO8 - Risk Standardized, All Condition Readmission	Strong correlation	Positive (i.e., lower score on ACO8 would be correlated with fewer admissions)
ACO27 - Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%)	Weak	Positive
ACO28 - Controlling High Blood Pressure	Weak	Negative

ACO MCC vs. CAHPS measures

We hypothesized that there would be a very weak negative correlation or no correlation between the ACO MCC measure and the CAHPS measures (ACO1 and ACO4) because:

*As outlined in the evidence attachment, better performance on the ACO MCC measure (lower admission rates for patients with MCCs) should signal appropriate outpatient care, which would include patients' access to such care.

*We expect the correlation to be weak because CAHPS measures often do not correlate, or only weakly correlate with other quality measures [1,2].

ACO MCC and the ACO All-Cause Readmission Measure

We hypothesized there would be a strong positive correlation between the ACO MCC measure and the Risk Standardized, All Condition Readmission measure (ACO 8) because:

*The two measures address an overlapping (but not identical) patient population (patients with MCCs vs. all ACO patients) and examine a similar quality domain (care coordination).

*The ACO MCC measures and ACO 8 are measuring an overlapping outcome (admissions and readmissions).

ACO MCC and Poor Control of Diabetes Measure

We hypothesized there would be a weak positive correlation between ACO MCC and the Diabetes, Poor Control measure (ACO 27) because:

*The two measures have overlapping, but not identical, cohorts (the ACO MCC measure has been re-specified to include diabetes patients; some of ACO 27 patients would be expected to also have other chronic conditions).

*The two measures are examining a similar quality domain: chronic disease management which would be expected to reduce the risk of a hospital admission. Higher measure scores on ACO 27 indicate that a higher proportion of that ACO's patients with diabetes have HbA1c values that are >9%, indicating poor control of their diabetes and higher measure scores on the ACO MCC measure indicate higher admission rates.

ACO MCC and Control of High Blood Pressure Measure

We hypothesized there would be a weak negative correlation between ACO MCC and the Controlling High Blood Pressure (ACO28) measure because:

*The two measures have overlapping, but not identical, cohorts (it is likely that many patients in the ACO MCC cohort have high blood pressure; some patients in the ACO27 cohort would be expected to also have other chronic conditions).

*The two measures are examining a similar quality domain: chronic disease management, which would be expected to reduce the risk of a hospital admission. In this case, the measure scores are in opposite directions: higher measure scores on ACO28 indicate better performance (a higher proportion of that ACO's patients have their blood pressure controlled); lower measure scores for ACO MCC indicate better performance.

We analyzed the relationship between the ACO MCC measure and each comparator measure in Table 3 (see Section 2b1.3) with a weighted Spearman correlation (weighted by the number of MCC patients attributed to the ACO) and adjusted for multiple comparisons using the Sidak method.

Citations:

1. Kennedy GD, Tevis SE, Kent KC. Is there a relationship between patient satisfaction and favorable outcomes? Ann Surg. 2014;260(4):592-600.
2. Llanwarne NR, Abel GA, Elliott MN, et al. Relationship between clinical quality and patient experience: analysis of data from the English quality and outcomes framework and the National GP Patient Survey. Ann Fam Med. 2013;11(5):467-472.

2b1.3. What were the statistical results from validity testing? (*e.g., correlation; t-test*)

Face Validity

We did not quantitatively assess the face validity of the measure during development (e.g. through a TEP vote). As noted above, however, the TEP and experts we consulted during measure development were supportive of the MCC cohort definition and use of admission as an outcome. During the public comment period, we also received comments on the measure cohort, outcome, and risk model. The feedback on the

measure focus and the measure's use for ACO quality reporting, overall, was positive. There was strong support expressed by the members of the TEP and in public comment for the validity of the measure.

Validity of the Outcome

Approximately 75% of Americans over age 65, and two-thirds of Medicare beneficiaries, have MCCs. [1,2]. People with MCCs have a higher risk of death, higher risk of functional decline, and reduced quality of life. [3-5] Studies suggest that the number of chronic conditions is directly related to the risk of death and rates of avoidable hospital admissions. [6-8] Although the conventional approach to care has been focused on addressing each disease separately – and judging the success of care by evaluating disease-specific endpoints – it is increasingly recognized that this approach can be counterproductive. Instead, coordinated, patient-centered care that addresses the full complexity of the needs of MCC patients is needed – with evaluation of its success based on universal, rather than disease-specific, outcomes. [9,10] Acute, unplanned hospital admissions represent patient-centered, rather than a disease-specific, outcomes.

The rationale for measuring acute unplanned hospital admissions for ACO chronic disease patients is that ACOs are established precisely to improve patient-centered care and outcomes for these patients. The goal of this measure is to illuminate variation among ACOs in hospital admission rates for people with MCCs and incentivize ACOs to expand efforts to develop and implement efficient and coordinated chronic disease management strategies that anticipate and respond to patients' needs and preferences. A number of studies have shown that improvements in the delivery of health care services for ambulatory patients with MCCs can lower the risk of admission [11-20]. Demonstrated strategies include improving access to and continuity of care, supporting self-care in the home, better coordinating care across providers, and integrating social work, nursing, and medical services.

Recent data suggests that ACOs are indeed focused on strategies to reduce hospital admissions and use hospital admissions to evaluate the success of their interventions. A 2018 Annual ACO Survey showed that across all ACO types, top priorities included reducing avoidable emergency department (ED) visits and inpatient admissions, as well as reducing re-admissions through better care transitions. [21] In a series of case studies on ACOs, ACOs with palliative care and serious illness programs often judged the outcomes of their programs by evaluating their effect on ED visits and hospital admissions. [21] These findings further support the use of hospital admissions as important outcomes in this setting as they are already widely recognized as signals of quality.

Finally, measurement of hospital admissions as an outcome is aligned with CMC's Strategic Framework for improving care for patients with MCCs, along with NQF's Measurement Framework for individuals with MCCs [22,23].

Empiric Validity

The results of the empiric validity (correlation) tests are shown below in Table 3. The results show a significant correlation in ACO measure scores in the expected direction and with the expected strength between the ACO MCC measure and two of the five comparator measures: ACO8 - Risk Standardized, All Condition Readmission and ACO27 - Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%). The ACO MCC measure was strongly positively correlated with ACO8, Risk Standardized All-Condition Readmissions, with a correlation coefficient of 0.42 ($p<.001$). The ACO MCC measure was weakly positively correlated with ACO27, Diabetes Poor Control, with a correlation coefficient of 0.18 ($p<.001$).

There was no significant correlation between the ACO MCC measure and the two CAHPS measures, or with ACO28, Controlling High Blood Pressure. While we expected only a weak, or no correlation with the CAHPS measure, we had hypothesized a weak negative correlation with ACO28, Controlling High Blood Pressure; yet we found no significant correlation. ACO28 is not adjusted for case mix; since blood pressure control may be particularly challenging among patients with MCCs and with advanced comorbidities, it is possible that differences in case mix across ACOs may have contributed to this lack of correlation.

Table 3: Empiric Validation Analyses (January 1, 2018-December 31, 2018)

MSSP Measure	No. of ACOs Compared	Spearman Correlation	P-value
ACO1 - CAHPS: Getting Timely Care, Appointments, and Information	548	0.09	0.331
ACO4 - CAHPS: Access to Specialists	548	-0.01	1.000
ACO8 - Risk Standardized, All Condition Readmission	548	0.42	<.001
ACO27 - Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%)	546	0.18	<.001
ACO28 - Controlling High Blood Pressure	544	-0.07	0.673

Citations:

1. Anderson G. Chronic Care: Making the Case for Ongoing Care. Princeton, NJ: Robert Woods Johnson Foundation, 2010.
2. Chronic Conditions among Medicare Beneficiaries, Chart Book, Baltimore, MD: Centers for Medicare & Medicaid Services, 2011.
3. Newman AB, Boudreau RM, Naydeck BL et al. A physiological index of comorbidity: Relationship to mortality and disability. J Gerontol A Biol Sci Med Sci 63A:603–609, 2008.
4. Marengoni A, Von Strauss E, Rizzuto D et al. The impact of chronic multimorbidity and disability on functional decline and survival in elderly persons. A community‐based, longitudinal study. J Intern Med 265:288‐295, 2008.
5. Bayliss EA, Ellis JL, Steiner JF. Subjective assessments of comorbidity correlate with quality of life health outcomes: Initial validation of a comorbidity assessment instrument. Health Qual Life Outcomes 3:51, 2005.
6. Vogeli C, Shields AE, Lee TA et al. Multiple chronic conditions: Prevalence, health consequences, and implications for quality, care management, and costs. J Gen Intern Med 22(Suppl 3):391–395, 2007.
7. Paez KA, Zhao L, Hwang W. Rising out‐of‐pocket spending for chronic conditions: A ten‐year trend. Health Aff 28:15‐25, 2009.
8. Lehnert T, Heider D, Leicht H et al. Health care utilization and costs of elderly persons with multiple medical conditions. Med Care Res Rev 68:387–420, 2011.
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12. Dale SB, Ghosh A, Peikes DN, et al. Two-Year Costs and Quality in the Comprehensive Primary Care Initiative. N Engl J Med. 374(24):2345-2356, 2016.
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15. Ruiz S, Snyder LP, Rotondo C, Cross-Barnet C, Colligan EM, Giuriceo K. Innovative Home Visit Models Associated With Reductions In Costs, Hospitalizations, And Emergency Department Use. Health Affairs. 36(3):425-432, 2017.

16. Edwards ST, Saha S, Prentice JC, Pizer SD. Preventing Hospitalization with Veterans Affairs Home-Based Primary Care: Which Individuals Benefit Most? Journal of the American Geriatrics Society. 65(8):1676-1683, 2017.
17. Krumme AA, Glynn RJ, Schneeweiss S, et al. Medication Synchronization Programs Improve Adherence To Cardiovascular Medications And Health Care Use. Health Aff (Millwood). 37(1):125-133, 2018.
18. Gabriel M, Powers C, Encinosa W, Bynum J. E-Prescribing and Adverse Drug Events: An Observational Study of the Medicare Part D Population With Diabetes. Medical care. 55(5):456-462, 2017.
19. Bazemore, A., et al. "Higher Primary Care Physician Continuity is Associated With Lower Costs and Hospitalizations." Ann Fam Med. 16(6): 492-497, 2018.
20. O'Malley, A. S., et al. "New approaches to measuring the comprehensiveness of primary care physicians." Health Serv Res. 54(2): 356-366, 2019.
21. Roiland R, Bleser WK, Muhlestein D, Saunders RS. How are ACOs prioritizing palliative care and other serious illness strategies? Health Affairs Blog, January 7, 2020.
22. Center for Medicare and Medicaid Services (CMS). Multiple Chronic Conditions: A Strategic Framework, December 2010. Available at: https://www.hhs.gov/sites/default/files/ash/initiatives/mcc/mcc_framework.pdf
23. NQF's Multiple Chronic Conditions Measurement Framework, May 2012. Accessed July 28, 2020. Available at: http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=71227

2b1.4. What is your interpretation of the results in terms of demonstrating validity? (i.*e., what do the results mean and what are the norms for the test conducted?*)

The validity of the ACO MCC measure is supported by the following three types of evidence: (1) TEP and public support of the measure, (2) validity of the outcome, and (3) external empiric comparisons with other outcome and clinical quality measures.

The validity of the measure is supported by feedback and comments received from the TEP and the public. There was strong support expressed by the members of the TEP and in public comment for the validity of the measure. Public comment feedback on the focus of the measure and on the use of the measure for ACO quality reporting, overall, was positive.

The validity of unplanned acute hospital admissions for patients with MCCs as an outcome is supported by the association between select care strategies (e.g., access to and continuity of care, supporting self-care in the home, better coordinating care across providers, and integrating social work, nursing, and medical services) with the outcome of hospital admissions, the use of this outcome by ACOs to measure improvements in their programs, alignment with national strategies, and with an externally published framework for measurement of quality for patients with MCCs.

The validity of the measure is further supported by the empiric validation results which demonstrate the expected correlation of the ACO MCC measure with other outcome and clinical quality measures [Risk-Standardized All-condition Readmission; Diabetes: Hemoglobin A1c (HbA1c) Poor Control (>9%)] that have overlapping quality domains and overlapping cohorts.

Taken together, the evidence cited above supports the validity of the ACO MCC measure.

2b2. EXCLUSIONS ANALYSIS

NA ☐ no exclusions — *skip to section 2b3*

2b2.1. Describe the method of testing exclusions and what it tests (*describe the steps—do not just name a method; what was tested, e.g., whether exclusions affect overall performance scores; what statistical analysis was used*)

All exclusions were determined by careful clinical review and have been made based on clinically relevant decisions and to ensure accurate calculation of the measure. To ascertain the impact of exclusions on the cohort, we examined overall frequencies and proportions of the total cohort excluded for each exclusion criterion. Rationales for the exclusions are detailed in data field S.7 of the Submission Form.

2b2.2. What were the statistical results from testing exclusions? (include overall number and percentage of individuals excluded)

The number and percentage of individuals excluded from the measure are shown below. Exclusion categories are not mutually exclusive (patients may fall into more than one exclusion category).

Table 4: Measure Exclusions

Exclusion	N	Percent
Patients without continuous enrollment in Medicare Part A or B during the measurement period.	616,406	7.73%
Patients enrolled in hospice at any time during the year prior to the measurement year or at the start of the measurement year.	159,857	2.00%
Patients without any visits with any of the TINs associated with the attributed ACO during the measurement year and the year prior to the measurement year.	38,789	0.5%
Patients not at risk for hospitalization at any time during the measurement year.	13,640	0.2%

2b2.3. What is your interpretation of the results in terms of demonstrating that exclusions are needed to prevent unfair distortion of performance results? (*i.e., the value outweighs the burden of increased data collection and analysis.* ***Note**: **If patient preference is an exclusion**, the measure must be specified so that the effect on the performance score is transparent, e.g., scores with and without exclusion*)

The exclusions for this measure are narrowly targeted and the rationale for each exclusion is presented in section S.9 of the ITS/submission form.

The largest exclusion (about 8% of attributed patients) removes patients after attribution if they did not have continuous enrollment in Medicare Part A or B during the measurement period. These patients are removed because enrollment is necessary for outcome identification during the measurement period.

In total, exclusions remove a modest percentage (about 10%) of attributed patients; about 90% of attributed patients remain in the cohort. All exclusions are required to produce a valid, reliable, and fair measure.

2b3. RISK ADJUSTMENT/STRATIFICATION FOR OUTCOME OR RESOURCE USE MEASURES

If not an intermediate or health outcome, or PRO-PM, or resource use measure, skip to section 2b4.

2b3.1. What method of controlling for differences in case mix is used?

☐ **No risk adjustment or stratification**

☒ **Statistical risk model with 49 risk adjustment variables.**

☐ **Stratification by risk categories**

☐ **Other,**

2b3.1.1 If using a statistical risk model, provide detailed risk model specifications, including the risk model method, risk factors, coefficients, equations, codes with descriptors, and definitions.

The final patient-level risk-adjustment model included 49 risk-adjustment variables, including 47 demographic and clinical variables and 2 social risk factors. We used a negative binomial regression model with linear variance (NB-1) to risk adjust the measure. See the data dictionary, Tables 3-6, in the accompanying Excel workbook for specific codes and definitions for each risk variable; the prevalence of each risk variable and the associated rate ratios are shown in the table at the end of this section.

Details of the risk model, including equations, are shown below in this section, as well as in the technical report for the MIPS MCC measure (Appendix E1) which is attached to this application.

Final multivariable risk-adjustment model: demographic, clinical, and social risk factors

Demographic

- Age

Nine chronic disease groups defined using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes

- Acute myocardial infarction
- Alzheimer's disease and related disorders or senile dementia
- Atrial fibrillation
- Chronic kidney disease
- Chronic obstructive pulmonary disease or asthma
- Depression
- Diabetes
- Heart failure
- Stroke or transient ischemic attack

Clinical comorbidities defined using Condition Categories (CCs) or ICD-9-CM codes

- Dialysis status
- Respiratory failure
- Liver disease
- Pneumonia
- Septicemia/shock
- Marked disability/frailty
- Hematologic/al diseases
- Advanced cancer
- Infectious and immune disorders
- Severe cognitive impairment
- Major organ transplant status
- Pulmonary heart disease
- Cardiomyopathy
- Gastrointestinal disease
- Iron deficiency anemia
- Ischemic heart disease except AMI
- Other lung disorders

- Vascular or circulatory disease
- Other significant endocrine disorders
- Other disabilities and paralysis
- Substance abuse
- Other neurologic disorders
- Specified arrhythmias and other heart rhythm disorders
- Hypertension
- Hip or vertebral fracture
- Lower-risk cardiovascular disease
- Cerebrovascular disease
- Morbid obesity
- Urinary disorders
- Psychiatric disorders other than depression

Measures of frailty/disability defined based on 1) use of durable medical equipment (DME) using Policy Group Maps maintained by Palmetto GBA under contract to CMS and 2) original reason for Medicare entitlement

- Walking aids
- Wheelchairs
- Hospital bed
- Lifts
- Oxygen
- Original reason for entitlement: disability insurance beneficiary
- Original reason for entitlement: end stage renal disease

Social risk factors

- Low AHRQ SES index
- Low physician-specialist density

Detailed Description of Hierarchical Model

The ACO MCC admission measure HGLM assumes the outcome has a known exponential family distribution and relates linearly to the covariates via a known link function, h. For the model, we assumed a negative binomial distribution with linear variance (NB-1) and a log link function (Note the NB-1 model was chosen to account for overdispersion in the data). Further, we accounted for the clustering within ACOs by estimating an ACO-specific effect, α_i, which we assume follows a normal distribution with mean μ and variance □□2, the between-ACO variance component. The following equations define the HGLM:

$$h\big(E(Y_{ij}|\boldsymbol{Z}_{ij},\omega_i)\big) = \log\big(E(Y_{ij}|\boldsymbol{Z}_{ij},\omega_i)\big) = \alpha_i + \boldsymbol{\beta}\boldsymbol{Z}_{ij} (1)$$

where □i □□□□□□□□i ; □i ~ N (0, □□2)

$i = 1 \ldots I; j = 1 \ldots n_i$

Where Y_{ij} denotes the outcome (number of unplanned admissions per the person-years of risk exposure) for the j-th patient attributed to the i-th ACO; $\boldsymbol{Z}_{ij} = \big(Z_{1ij}, Z_{2ij,} \ldots, Z_{Pij} \big)$ is a set of p patient-specific covariates derived from the data; I denotes the total number of ACOs and n_i the number of patients attributed to ACO i. The ACO-specific intercept of the i-th ACO, α_i, defined above, comprises μ, the adjusted average intercept over all ACOs in the sample, and ω_i, the ACO-specific intercept deviation from μ. A point estimate of ω_i,

greater or less than 0, determines whether the ACO's performance is worse or better compared to the adjusted average outcome.

Further, Y_{ij} can be expressed as $Y_{ij} = N_{ij} / M_{ij}$ where N_{ij} denotes the total number of admissions during the measurement period and follows the negative binomial distribution with mean, $\mu_{ij}|\boldsymbol{Z}_{ij},\omega_i$, and variance with dispersion parameter θ, $\mu_{ij}|\boldsymbol{Z}_{ij},\omega_i\ (1+\ \theta)$. M_{ij} denotes the person-years of risk exposure for the j-th patient attributed to the i-th ACO. Given this, we re-write Equation (1) as:

$$\log\big(E(N_{ij}|\boldsymbol{Z}_{ij},\omega_i)\big) = \alpha_i + \boldsymbol{\beta}\boldsymbol{Z}_{ij} + \log\big(M_{ij}\big) \qquad (2)$$

where $\log\ (M_{ij})$ becomes the offset used to correct for the time at risk.

We estimate the HGLM using Stata version 15 (StataCorp, College Station, TX) (MENBREG function).

Prevalence of each risk variable and the associated rate ratios for variables in the final risk model for the ACO MCC measure.

Variable	ACO MCC Cohort n = 2,515,727: Prevalence of risk factors n (%)	ACO MCC Cohort n = 2,515,727: Adjusted rate ratio (95% CI)
Crude rate (per 100 person-years)	38.6	- -
Total number of admissions	888,384	- -
Total person time at risk (in years)	2,299,296	- -
- -	- -	- -
Demographic	- -	- -
Age <70 y/o	402,597 (16.0%)	- -
Age 70 to <75 y/o	576,570 (22.9%)	1.10 (1.09, 1.11)
Age 75 to <80 y/o	536,358 (21.3%)	1.25 (1.24, 1.26)
Age 80 to <85 y/o	444,974 (17.7%)	1.46 (1.44, 1.47)
Age >=85 y/o	555,228 (22.1%)	1.84 (1.82, 1.86)
Nine chronic disease groups	- -	- -
AMI	54,792 (2.2%)	1.07 (1.06, 1.09)
ALZHEIMERS AND RELATED DISORDERS	574,520 (22.8%)	1.27 (1.26, 1.28)
ATRIAL FIBRILLATION	666,657 (26.5%)	1.16 (1.16, 1.17)
CHRONIC KIDNEY DISEASE	1,326,617 (52.7%)	1.20 (1.20, 1.21)
COPD/ASTHMA	870,845 (34.6%)	1.22 (1.21, 1.23)
DEPRESSION	880,578 (35.0%)	1.08 (1.07, 1.08)
HEART FAILURE	949,703 (37.8%)	1.38 (1.37, 1.38)
STROKE/TRANSIENT ISCHEMIC ATTACK	328,625 (13.1%)	1.08 (1.08, 1.09)
DIABETES	1,443,060 (57.4%)	1.12 (1.11, 1.12)
Clinical comorbidities Defined using Condition Categories (CCs) or International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes	- -	- -
Dialysis status (CC 134)	39,411 (1.6%)	1.48 (1.46, 1.50)
Respiratory failure (CC 82, 83, 84)	248,238 (9.9%)	1.12 (1.11, 1.13)
Liver disease (CC 27 [remove K767], 28, 29, 30)	58,222 (2.3%)	1.24 (1.22, 1.26)
Pneumonia (CC 114, 115, 116)	365,887 (14.5%)	1.19 (1.18, 1.19)
Septicemia/shock (CC 2)	157,048 (6.2%)	1.05 (1.04, 1.06)
Marked disability/frailty (CC 21, 70, 71, 73, 157, 158, 159, 160, 161, 189, 190)	278,580 (11.1%)	1.23 (1.22, 1.24)
Hematologic/al diseases (CC 46 [remove D593], 48)	288,297 (11.5%)	1.04 (1.04, 1.05)
Advanced cancer (CC 8, 9, 10, 13)	181,729 (7.2%)	1.30 (1.29, 1.31)
Infectious and immune disorders (CC 1, 3, 4, 5 [remove A1811], 6, 47, 90)	154,635 (6.1%)	1.09 (1.08, 1.10)
Severe cognitive impairment (CC 50 [remove F05, F061, F068], 64, 65, 80)	170,681 (6.8%)	1.10 (1.09, 1.11)
Major organ transplant status (CC 132, 186)	23,946 (1.0%)	1.08 (1.06, 1.11)
Pulmonary heart disease (ICD-10-CM I2601, I2602, I2609, I270, I271, I272, I2789, I2781, I279, I280, I281, I288, I289)	113,325 (4.5%)	1.15 (1.14, 1.16)

Variable	ACO MCC Cohort n = 2,515,727: Prevalence of risk factors n (%)	ACO MCC Cohort n = 2,515,727: Adjusted rate ratio (95% CI)
Cardiomyopathy (ICD-10-CM I420, I421, I422, I425, I426, I427, I428, I429, I43, I514, I515)	228,362 (9.1%)	1.06 (1.05, 1.07)
Gastrointestinal disease (CC 31, 32, 33, 35, 36)	535,909 (21.3%)	1.07 (1.07, 1.08)
Iron deficiency anemia (CC 49)	1,059,188 (42.1%)	1.16 (1.16, 1.17)
Ischemic heart disease except AMI (CC 87, 88, 89, 98; add ICD-10 I511, I512)	1,310,396 (52.1%)	1.15 (1.14, 1.15)
Other lung disorders (CC 112 [remove J470, J471, J479], 118)	1,065,521 (42.4%)	1.01 (1.01, 1.02)
Vascular or circulatory disease (CC 106, 107, 108, 109 [remove I701, I722])	1,171,861 (46.6%)	1.15 (1.14, 1.15)
Other significant endocrine disorders (CC 23 [remove E748, N251, N2581])	152,020 (6.0%)	1.05 (1.04, 1.06)
Other disabilities and paralysis (CC 72, 74, 103, 104, 119)	141,113 (5.6%)	1.09 (1.08, 1.10)
Substance abuse (CC 54, 55, 56)	305,556 (12.1%)	1.20 (1.20, 1.21)
Other neurologic disorders (75, 77, 78, 79, 81, 105)	824,144 (32.8%)	1.09 (1.09, 1.10)
Specified arrhythmias and other heart rhythm disorders (CC 96 [remove I480, I481, I482, I4891] and 97)	783,696 (31.2%)	1.05 (1.04, 1.05)
Hypertension (CC 95)	2,263,526 (90.0%)	1.06 (1.05, 1.07)
Hip or vertebral fracture (CC 169, 170)	121,661 (4.8%)	1.07 (1.06, 1.08)
Lower-risk cardiovascular disease (CC 91, 92, 93)	705,239 (28.0%)	1.03 (1.02, 1.03)
Cerebrovascular disease (CC 102 [remove I6789])	136,404 (5.4%)	1.05 (1.04, 1.06)
Morbid obesity (ICD-10-CM E6601, Z6835, Z6836, Z6837, Z6838, Z6839, Z6841, Z6842, Z6843, Z6844, Z6845)	350,232 (13.9%)	1.03 (1.03, 1.04)
Urinary disorders (CC 142 [remove N131, N132, N1330, N1339, Q620, Q6210, Q6211, Q6212, Q622, Q6231, Q6232, Q6239] and 145 [remove N2589, N259, N261, N269, Q6102, Q612, Q613, Q614, Q615, Q618])	755,594 (30.0%)	1.04 (1.04, 1.05)
Psychiatric disorders other than depression (CC 57, 59, 60, 62, 63 [remove F4321])	675,720 (26.9%)	1.07 (1.06, 1.07)
Frailty indicators Defined using Noridian Policy Groups for DME or original reason for Medicare entitlement	- -	- -
Walking aids	125,644 (5.0%)	0.97 (0.96, 0.97)
Wheelchairs	90,983 (3.6%)	1.12 (1.11, 1.13)
Hospital bed	33,877 (1.3%)	1.10 (1.09, 1.12)
Lifts	7,460 (0.3%)	1.02 (0.99, 1.06)
Oxygen	208,070 (8.3%)	1.38 (1.37, 1.39)
Original Reason for entitlement: DIB (may or may not have ESRD)	335,857 (13.4%)	1.26 (1.25, 1.27)
Original Reason for entitlement: ESRD (may or may not have DIB)	9,210 (0.4%)	1.21 (1.17, 1.26)
Social risk factors	- -	- -
Low AHRQ SES index score (<=25th pct)	384,354 (15.3%)	1.08 (1.07, 1.09)
Low specialist density (<=25th pct)	80,468 (3.2%)	1.03 (1.02, 1.04)

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2b3.2. If an outcome or resource use component measure is *not risk adjusted or stratified*, provide *rationale and analyses* to demonstrate that controlling for differences in patient characteristics (case mix) is not needed to achieve fair comparisons across measured entities.

Not applicable, this measure is risk-adjusted.

2b3.3a. Describe the conceptual/clinical *and* statistical methods and criteria used to select patient factors (clinical factors or social risk factors) used in the statistical risk model or for stratification by risk (*e.g., potential factors identified in the literature and/or expert panel; regression analysis; statistical significance of p<0.10; correlation of x or higher; patient factors should be present at the start of care*) **Also discuss any "ordering" of risk factor inclusion**; for example, are social risk factors added after all clinical factors?

The overall goal of our risk-adjustment approach is to ensure that the measure fairly accounts for patient mix across ACOs [1]. Therefore, the measure risk adjusts to account for factors that are associated with the outcome (that is, unplanned hospital admissions), vary across ACOs, and are unrelated to quality of care so that measure scores reflect differences in care quality.

In order to harmonize measures across programs, CMS has aligned the risk-adjustment approach for the ACO MCC and the MIPS MCC measures (submitted for initial NQF endorsement in this same cycle). Below we outline the original development of the risk model and then provide updates regarding additional risk variables added to the ACO MCC measure's risk-adjustment model that are consistent with the conceptual mode for the measure and fully aligned with the MIPS MCC measure.

Original ACO MCC Measure Development

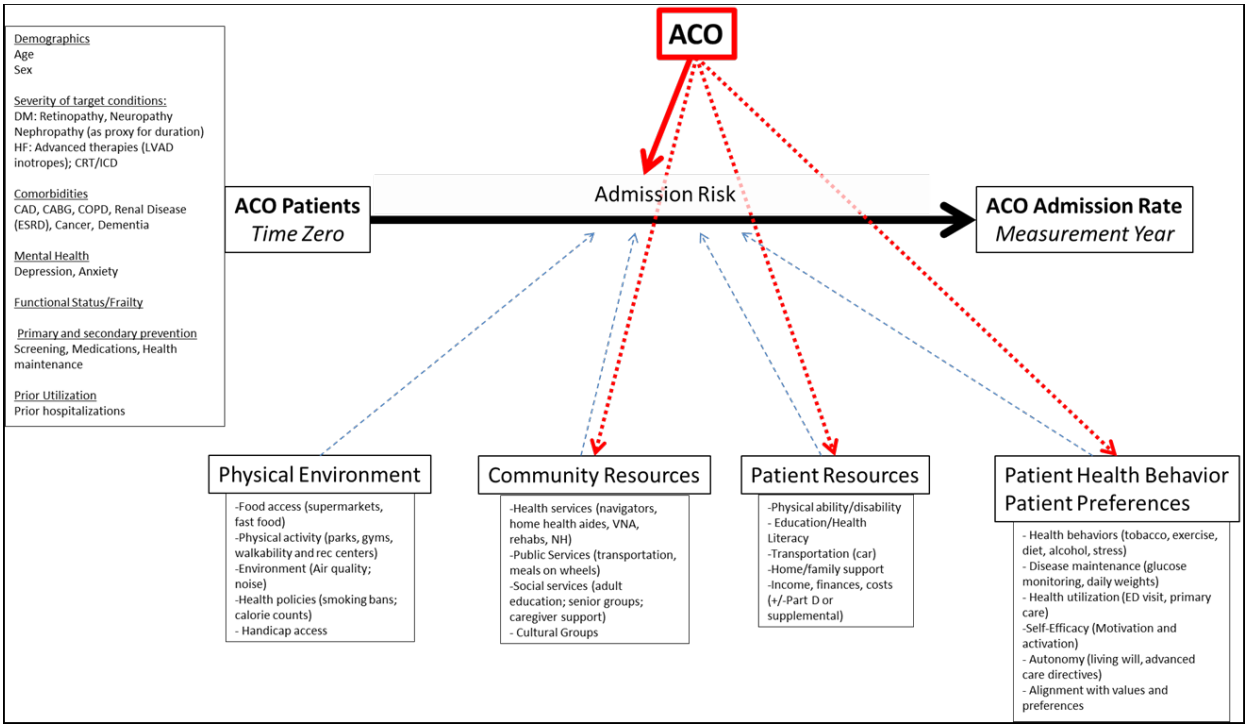
We selected the risk-adjustment model variables based on the existing literature, clinical judgment, empirical analyses, and input from our TEP and other experts. We considered factors that may impact the rate of admission, including patient-level factors (e.g., demographics, SES, clinical risk factors on admission); we also considered the impact of other non-clinical factors such as health behaviors and community resources.

We were guided by a conceptual model that was informed by a literature review and environmental scan, outlining the relationships between potential clinical and contextual factors and rates of admissions among chronic disease populations cared for by ACOs. Importantly, many factors other than traditional medical care delivered in the office or hospital settings will impact health outcomes for patients with chronic disease. For example, ACOs practicing in communities where patients have limited access to transportation, healthy foods, and recreational facilities may have less success in promoting healthy behaviors among patients with MCCs; this may in turn impact quality outcomes. Recognition of and attention to the health environment may be important for achieving the goals of better care, better health and lower costs and thus, shared savings.

The conceptual model (Figure 1) was presented and endorsed by the TEP engaged during the development of the original ACO MCC measure. The conceptual model recognizes patient-level demographic and clinical factors, along with 4 contextual domains that may influence ACO performance: (1) physical environment (e.g., green spaces; safe streets); (2) community resources (e.g., home health; senior services); (3) patient resources (e.g., social support; transportation; income); and (4) patient behavior/personal preferences (e.g., exercise; diet; advanced care directives; preference for intervention).

The conceptual model for the original ACO MCC measure also recognizes the capacity of ACOs to mitigate the effects of many contextual factors on rates of admissions, encompassing both SES and non-SES variables, and supporting CMS's decision at the time not to adjust for contextual factors in the version of the measure that went through initial endorsement due to concerns that adjusting for contextual factors would obscure important differences in ACO quality and could serve as a disincentive for ACOs to engage with such factors. [2]

Figure 1. Conceptual model of factors affecting risk of hospital admission (from original measure development and initial endorsement)



Conceptual Model for Endorsement Maintenance

As mentioned above, CMS sought to align the ACO MCC measure with the risk-standardized unplanned hospital admission measure developed for clinician groups for the Merit-Based Incentive Payment System (MIPS). The MIPS MCC measure has been submitted in this same NQF endorsement cycle for initial endorsement.

To align risk-adjustment variables for the two measures, we added two types of risk variables to the MIPS MCC measure:

1) Adjustment for disability/frailty. The updated ACO MCC measure adjusts for disability/frailty based on use of selected durable medical equipment.

Rationale: CMS included the frailty variables in both measures to account for increased admission risk among frail patients. The conceptual model for the original ACO MCC measure noted the influence of frailty on admission risk (see far left box of figure), but when the measure was first developed, we and other developers had not yet tested claims-based variables to represent frailty in measure risk models. Their inclusion in the revised ACO MCC measure better addresses the conceptual model for this measure as suggested by ASPE while aligning it with the MIPS MCC measure. [3]

2) Adjustment for two social risk factors that influence admission risk. The updated ACO MCC measure adjusts for two social risk factor variables, low AHRQ SES index, and low physician specialist density.

Rationale: CMS included the two social risk factor adjusters in the ACO MCC updated measure primarily to fully align the measure with the MIPS MCC measure. CMS included these variables in the MIPS MCC measure because clinicians working in the community have a limited ability to influence these community-based contextual factors that affect admission risk (see Section 2b3.3a of the MIPS MCC testing form for details). As illustrated in Figure 1, the ACO MCC conceptual model acknowledges that low SES influences admission risk. Greater specialist density, although not initially considered for the ACO measure, as articulated in the MIPS MCC application, could also reduce risk for patients with multiple chronic conditions. CMS acknowledges that ACOs typically have a greater ability to mitigate the increased admission risk associated with social risk factors than smaller physician groups that will be measured by the MIPS MCC measure. On balance, however, CMS decided it was both consistent with the conceptual model and programmatically important to align the two admission measures given their use in the two QPP programs.

As shown in in the table at the end of this section, we examined the prevalence of each risk variable and the associated relative risk ratio and confirmed these redefined and additional variables contributed model performance in the expected direction for the ACO MCC measure.

In addition, to be fully transparent and inform the approach to adjusting for SRFs, we present supplementary social risk factor testing results for the updated ACO MCC measure in Section 2b3.4b, including dual eligibility.

Model Form

The measure calculates risk-standardized acute admission rates for ACOs based on their MCC patients' unplanned hospital admissions during the measurement period. The RSAAR for each ACO is calculated as the ratio of the number of "predicted" to the number of "expected" admissions per 100 person-years, multiplied by the national rate of admissions among all Medicare FFS patients with MCCs attributed to MSSP ACOs. The measure uses a hierarchical (two-level) negative binomial model with linear variance that adjusts for demographic, clinical, and social risk factors; accounts for the clustering of patients within ACOs; and accommodates the varying MCC patient population size across ACOs.

We selected the MIPS MCC model form based on statistical considerations, and given the similarities in demographics, clinical, and social risk factors between patients assigned to ACOs and MIPS-eligible clinician groups, we applied the same model to the ACO measure. Since the outcome of number of acute hospital admissions was over dispersed (variance of the outcome exceeded the mean), we used the negative binomial with linear variance or NB-1. We examined fit through use of an internal calibration plot that compared observed and predicted admission rates across deciles of admission risk.

Citations

1. Krumholz HM, Brindis RG, Brush JE, et al. Standards for Statistical Models Used for Public Reporting of Health Outcomes: An American Heart Association Scientific Statement From the Quality of Care and Outcomes Research Interdisciplinary Writing Group: Cosponsored by the Council on Epidemiology and Prevention and the Stroke Council Endorsed by the American College of Cardiology Foundation. Circulation 113: 456-462, 2006.
2. Drye EE, Altaf FK, Lipska K, Spatz ES, Montague JA, Bao H, Parzynski CS, Ross JS, Bernheim SM, Krumholz HM, Lin Z. Defining multiple chronic conditions for quality measurement. Med Care. 56(2):193-201, 2018.
3. Department of Health and Human Services, Office of the Assistant Secretary of Planning and Evaluation (ASPE). Second Report to Congress: Social Risk Factors and Performance in Medicare's Value-based Purchasing Programs. 2020; https://aspe.hhs.gov/system/files/pdf/263676/Social-Risk-in-Medicare%E2%80%99s-VBP-2nd-Report.pdf. Accessed July 8, 2020.

2b3.3b. How was the conceptual model of how social risk impacts this outcome developed? Please check all that apply:

☒ **Published literature**

☐ **Internal data analysis**

☐ **Other (please describe)**

2b3.4a. What were the statistical results of the analyses used to select risk factors?

Risk factors for the updated ACO MCC measure are based on risk factor selection from the MIPS MCC measure. For the MIPS MCC measure, we began with 54 candidate demographic and clinical variables and 33 potential candidate social risk factors based on our prior work on the original ACO MCC measure. Based on our variable selection criteria and statistical methods detailed above in Section 2b3.3a, we excluded a total of 7 candidate clinical variables because they had a prevalence of less than 0.5% (1 variable), had an unadjusted rate ratio of less than 1.3 (3 variables), or were not retained in at least 90% of the bootstrap results (3 variables), leaving 47 demographic and clinical variables in the final model. As detailed above in Section 2b3.3a, once these patient factors were selected, we took a phased approach to evaluating and selecting the social risk factors. After adjusting for the demographic and clinical variables as well as each other, 2 social risk

factors were retained in the final model. Thus, the final risk-adjustment model included 47 demographic and clinical variables and 2 social risk factors (see Section 2b3.1.1 for the list of variables in the final model).

2b3.4b. Describe the analyses and interpretation resulting in the decision to select social risk factors *(e.g. prevalence of the factor across measured entities, empirical association with the outcome, contribution of unique variation in the outcome, assessment of between-unit effects and within-unit effects.)* **Also describe the impact of adjusting for social risk (or not) on providers at high or low extremes of risk.**

Consistent with our conceptual framework and statistical approach to risk factor selection, the MIPS ACO measure includes 2 social risk factors in the final risk-adjustment model: AHRQ SES Index and physician-specialist density. (Please see Section 2b3.4a of the MIPS MCC testing attachment for the testing results for the MIPS MCC measure.) To align the MIPS and ACO measures, CMS decided to apply the same social risk factor adjustment to the ACO measure. Below we present supplementary social risk factor testing results, including dual eligibility. These results are presented for transparency but were not used to inform the decision to include social risk factors in the model.

The results from testing social risk factor adjustment in the ACO measure are presented below in Table 2.

Table 2: Social Risk factor analyses: ACO MCC measure

Social Risk Factor	Univariate model RR (95% CI) (unadjusted)	Multivariate model RR (95% CI) (adjusted for demographic and clinical variables)	Multivariate model RR (95% CI) (additionally adjusted for AHRQ SES index and physician-specialist density)	Multivariate model RR (95% CI) (additionally adjusted for dual eligibility status)
Low AHRQ SES Index	1.14 (1.13, 1.14)	1.08 (1.07, 1.09)	1.08 (1.07, 1.09)	1.06 (1.05, 1.06)
Low specialist density	1.07 (1.06, 1.09)	1.04 (1.03, 1.06)	1.03 (1.02, 1.04)	1.03 (1.02, 1.04)
Medicare-Medicaid dual eligibility status	1.53 (1.52, 1.54)	1.19 (1.18, 1.19)	- -	1.18 (1.17, 1.18)

- - cell intentionally left blank

2b3.5. Describe the method of testing/analysis used to develop and validate the adequacy of the statistical model *or* stratification approach (*describe the steps—do not just name a method; what statistical analysis was used*)

The measure uses the number of acute unplanned hospital admissions per person-year at risk for admission as the outcome. Because the outcome is a count of hospital admissions – rather than a binary outcome, such as whether or not a patient has been admitted – several routinely used metrics of model performance cannot be applied (for example, we cannot use a c-statistic).

We therefore computed the goodness-of-fit statistic (deviance R-squared) for assessing the risk-adjustment model performance.

Deviance R-squared (model discrimination)

We calculated deviance R-squared using the deviance residual defined by Cameron [1]. 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. For example, a deviance R-squared value of 0.12 means that the fit explains 12% of the total deviance.

Model performance among patients at different risk of admission (model calibration)

In order to determine whether the model performs well across groups of patients at different risk of admission, the sample was divided into quartiles of predicted admission rate. We then assessed the predicted probability of the number of admissions derived from the model compared with the observed probability of the number of admissions. The predicted probability for a group of patients is the average probability of observing 0, 1, 2, …n hospital admissions, given these patients' risk factors for admission. The observed probability of each count of admissions for a group of patients is the proportion of these patients admitted to the hospital 0, 1, 2, …n times.

Citation:

1. Cameron AC and AG Windmeijer. R-Squared Measures for Count Data Regression Models with Applications to Health-Care Utilization. J Bus & Econ Stat, 14(2):209-220, 1996.

Provide the statistical results from testing the approach to controlling for differences in patient characteristics (case mix) below.

If stratified, skip to 2b3.9

2b3.6. Statistical Risk Model Discrimination Statistics (*e.g., c-statistic, R-squared*)**:**

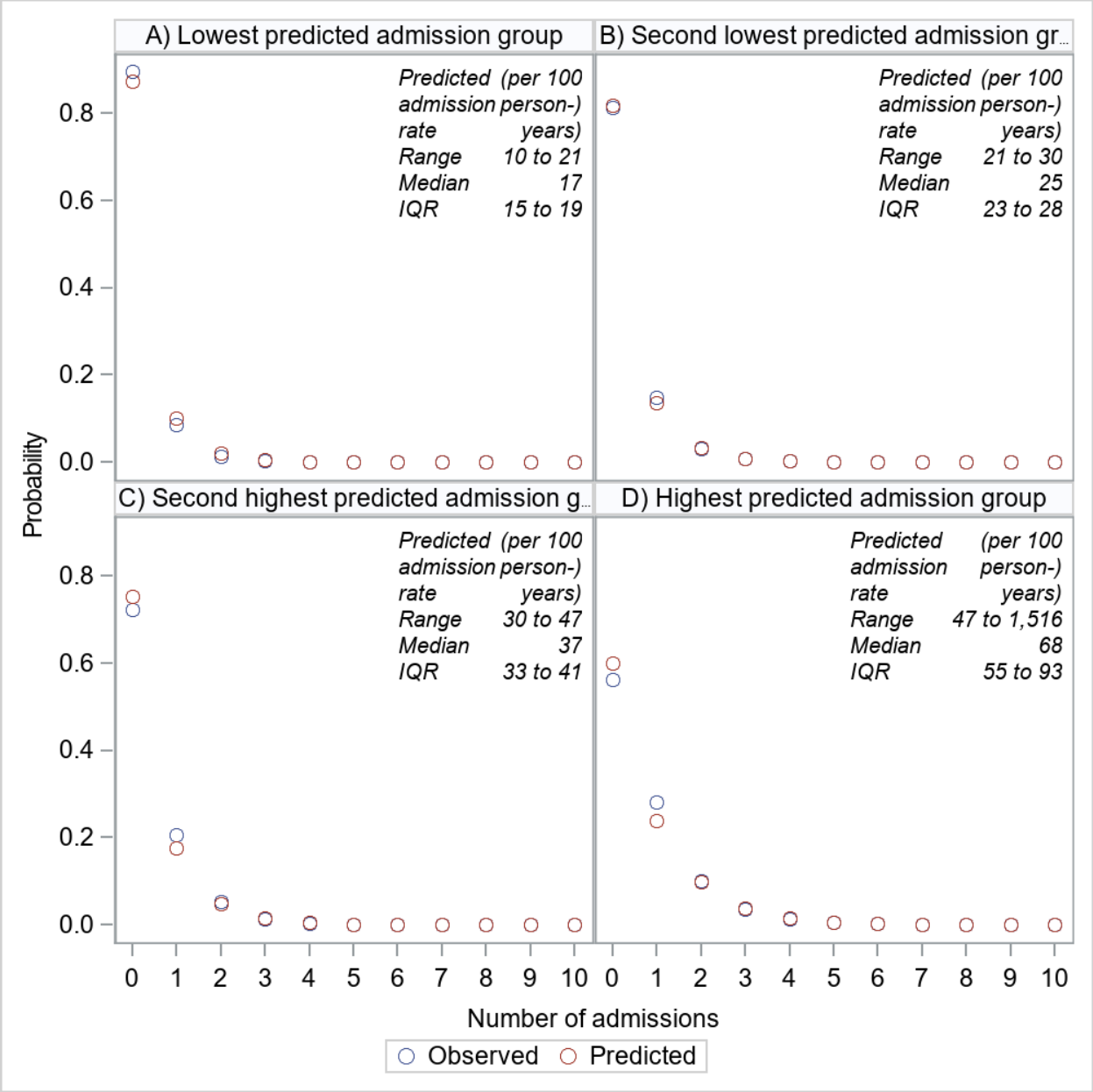
The deviance R-squared for the model with demographic, clinical, and social risk factors was 0.111 indicating that the model explains 11.1% of the variation in admission rates.

2b3.7. Statistical Risk Model Calibration Statistics (*e.g., Hosmer-Lemeshow statistic*):

Below we provide risk model calibration testing in the form of risk decile plots.

2b3.8. Statistical Risk Model Calibration – Risk decile plots or calibration curves:

A comparison of observed versus predicted probability for the number of hospital admissions among patients with multiple chronic conditions by risk quartile is shown below.



The plots of observed and predicted probabilities for each number of hospital admissions (0, 1, 2, …, 10) across quartiles of risk showed that the model performs well across a broad range of risk. In the highest-risk group, we found that the observed and predicted probabilities for zero and one admission differed slightly. However, these differences were small and somewhat expected among the highest-risk group of patients.

2b3.9. Results of Risk Stratification Analysis:

N/A. This measure is not stratified.

2b3.10. What is your interpretation of the results in terms of demonstrating adequacy of controlling for differences in patient characteristics (case mix)? (i.*e., what do the results mean and what are the norms for the test conducted*)

The results demonstrate the risk-adjustment model adequately controls for differences in patient characteristics.

Discrimination statistics: Model performance testing showed good model discrimination and fit. This held with adjustment for clinical, demographic, and social risk factors.

Risk decile plots: The plots, which showed that the predicted risk closely approximated the observed risk in most deciles, suggest very good calibration.

Overall interpretation: Interpreted together, our diagnostic results demonstrate the risk-adjustment model adequately controls for differences in patient characteristics (case mix).

2b3.11. Optional Additional Testing for Risk Adjustment (***not required****, but would provide additional support of adequacy of risk model, e.g., testing of risk model in another data set; sensitivity analysis for missing data; other methods that were assessed*)

Not applicable.

_____

2b4. IDENTIFICATION OF STATISTICALLY SIGNIFICANT & MEANINGFUL DIFFERENCES IN PERFORMANCE

2b4.1. Describe the method for determining if statistically significant and clinically/practically meaningful differences in performance measure scores among the measured entities can be identified (*describe the steps—do not just name a method; what statistical analysis was used? Do not just repeat the information provided related to performance gap in 1b)*

The measure score is an ACO-level risk-standardized acute admission rate (RSAAR). We characterize the degree of variability by reporting the distribution of RSAARs across ACOs and by providing the median rate ratio (MRR) [1]. The median rate ratio represents the median increase in rate of acute unplanned admission if a single patient was attributed to a higher risk ACO compared to a lower risk ACO. It is calculated by taking all possible combinations of providers, always comparing the higher-risk provider to the lower-risk provider. The MRR is interpreted as a traditional rate ratio would be.

Citations

1. Austin, PC, Stryhn, H, Leckie, G, Merlo, J. Measures of clustering and heterogeneity in multilevel Poisson regression analyses of rates/count data. Statistics in Medicine. 2018; 37: 572– 589. https://doi.org/10.1002/sim.7532

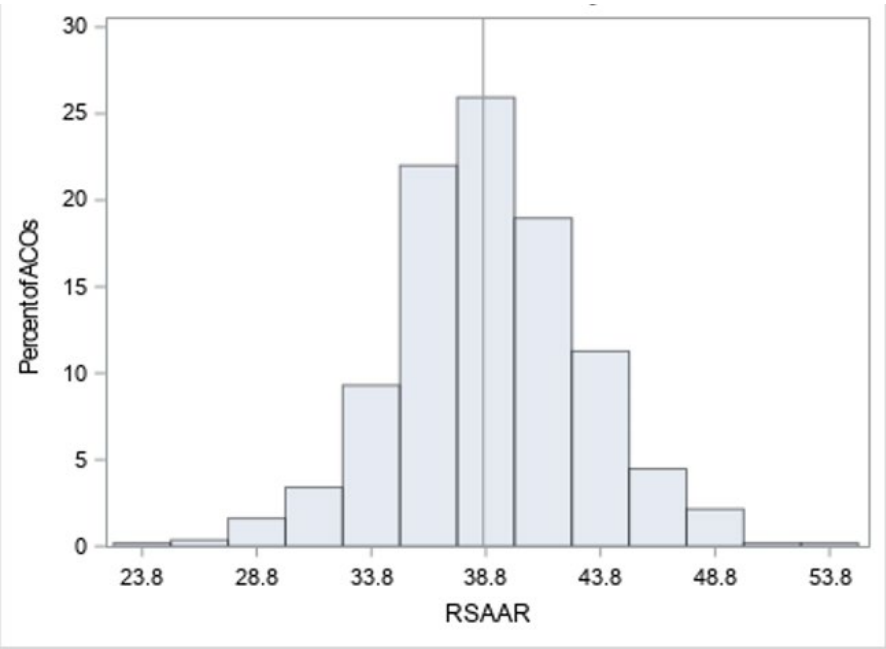
2b4.2. What were the statistical results from testing the ability to identify statistically significant and/or clinically/practically meaningful differences in performance measure scores across measured entities? (e.g., *number and percentage of entities with scores that were statistically significantly different from mean or some benchmark, different from expected; how was meaningful difference defined*)

Distribution of RSAAR

ACOs with at least one attributed MCC patient (N=559): The risk-standardized measure scores had a median value of 38.6 and mean value of 38.9 (standard deviation +/-4.2) admissions per 100 person-years. The percentiles of the distribution:

Min	1st	5th	10th	25th	50th	75th	90th	95th	99th	Max
23.6	28.6	31.7	33.7	36.4	38.6	41.5	44.3	46.1	48.6	53.3

We also show the distribution in the form of a histogram, below, for ACO with at least one attributed MCC patient (N=559).



Median Rate Ratio (MRR)= 1.12.

2b4.3. What is your interpretation of the results in terms of demonstrating the ability to identify statistically significant and/or clinically/practically meaningful differences in performance across measured entities? (i.*e., what do the results mean in terms of statistical and meaningful differences?*)

As the results above show, across the 559 ACOs with at least one MCC patient, RSAAR measure scores, including adjustment for the social risk factors of AHRQ SES Index, and physician-specialist density, ranged from 23.6 to 53.3 per 100 person-years, with a median of 38.6 and an IQR of 36.4 to 41.5. This indicates that after adjustment half of Medicare patients with multiple chronic conditions had between 36 and 41 acute admissions in a year.

Furthermore, the 10th and 90th percentiles, representing the best and worst performers, had an admission rate of 33.7 and 44.3 respectively, which reflects meaningful deviations from the median (the 10th percentile had about 13% fewer admissions per 100-person years compared with the median; the 90th percentile had 15% more admissions per 100-person years compared with the median). In addition, the best performing 5% of ACOs had 18% fewer admissions (31.7) per 100-person years compared with the median, whereas the worst-performing 5% of ACOs (46.1) had 19% more admissions compared with the median.

The median rate ratio (MRR) suggest meaningful increases in the rate of acute unplanned admission if a single patient was attributed to a higher-risk ACO compared to a lower-risk ACO. The MRR value of 1.12 indicates that a patient has a 12% higher admission rate if the patient was attributed to a higher-risk ACO compared with a lower-risk ACO indicating that the impact of quality on the outcome rate is meaningful.

Overall, our results suggest that there is substantial need to both reduce the number of admissions for this patient population, as well as decrease the variation in admissions across ACOs, and that improvement goals are achievable.

2b5. COMPARABILITY OF PERFORMANCE SCORES WHEN MORE THAN ONE SET OF SPECIFICATIONS

If only one set of specifications, this section can be skipped.

Note*: This item is directed to measures that are risk-adjusted (with or without social risk factors)* ***OR*** *to measures with more than one set of specifications/instructions (e.g., one set of specifications for how to identify and compute the measure from medical record abstraction and a different set of specifications for claims or eMeasures). It does not apply to measures that use more than one source of data in one set of specifications/instructions (e.g., claims data to identify the denominator and medical record abstraction for the numerator).* ***Comparability is not required when comparing performance scores with and without social risk***

factors in the risk adjustment model. However, if comparability is not demonstrated for measures with more than one set of specifications/instructions, the different specifications (e.g., for medical records vs. claims) should be submitted as separate measures.

2b5.1. Describe the method of testing conducted to compare performance scores for the same entities across the different data sources/specifications (*describe the steps—do not just name a method; what statistical analysis was used*)

Items 2b5.1 – 2b5.3 not applicable; this measure has only one set of specifications.

2b5.2. What were the statistical results from testing comparability of performance scores for the same entities when using different data sources/specifications? (*e.g., correlation, rank order*)

Items 2b5.1 – 2b5.3 not applicable; this measure has only one set of specifications.

2b5.3. What is your interpretation of the results in terms of the differences in performance measure scores for the same entities across the different data sources/specifications? (i.*e., what do the results mean and what are the norms for the test conducted*)

Items 2b5.1 – 2b5.3 not applicable; this measure has only one set of specifications.

2b6. MISSING DATA ANALYSIS AND MINIMIZING BIAS

2b6.1. Describe the method of testing conducted to identify the extent and distribution of missing data (or nonresponse) and demonstrate that performance results are not biased due to systematic missing data (or differences between responders and nonresponders) and how the specified handling of missing data minimizes bias (*describe the steps—do not just name a method; what statistical analysis was used*)

Demographic and clinical variables were ascertained using claims data and, as such, were known for all patients in the study cohort. Missing data for the area-level social risk factors (i.e., AHRQ SES Index and physician-specialist density) were investigated by checking whether or not the patient's ZIP code was available and could be matched to the area-level values.

2b6.2. What is the overall frequency of missing data, the distribution of missing data across providers, and the results from testing related to missing data? (*e.g., results of sensitivity analysis of the effect of various rules for missing data/nonresponse;* ***if no empirical sensitivity analysis****, identify the approaches for handling missing data that were considered and pros and cons of each*)

Of the 2,577,907 Medicare FFS patients attributed to an ACO, 9,722 (0.38%) patients had missing data for one or both social risk factors included in the risk model. These patients had P.O. boxes or business ZIP codes, or lived in US territories for which data were unavailable. Across all 559 ACOs, ACOs in the 90th and 99th percentiles had 29 and 150 patients with missing data, respectively, with a maximum of 2465 patients.

2b6.3. What is your interpretation of the results in terms of demonstrating that performance results are not biased due to systematic missing data (or differences between responders and nonresponders) and how the specified handling of missing data minimizes bias**?** (i.*e., what do the results mean in terms of supporting the selected approach for missing data and what are the norms for the test conducted;* ***if no empirical analysis****, provide rationale for the selected approach for missing data*)

Excluding 0.38% of patients with missing social risk factor data would not likely affect the quintile of RSAARs for the majority ACOs. We examined shifts in the MIPS MCC measure (where a similar proportion – 0.44% – had missing social risk factor data) and a shift in the quintile of RSAARs occurred only for providers with very small patient volume and for whom the measure is not meant to be reported.

3. Feasibility

Extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

3a. Byproduct of Care Processes

For clinical measures, the required data elements are routinely generated and used during care delivery (e.g., blood pressure, lab test, diagnosis, medication order).

3a.1. Data Elements Generated as Byproduct of Care Processes.

Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims)

If other:

3b. Electronic Sources

The required data elements are available in electronic health records or other electronic sources. If the required data are not in electronic health records or existing electronic sources, a credible, near-term path to electronic collection is specified.

3b.1. To what extent are the specified data elements available electronically in defined fields (*i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields*) Update this field for ***maintenance of endorsement***.

ALL data elements are in defined fields in electronic claims

3b.2. If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources. For ***maintenance of endorsement***, if this measure is not an eMeasure (eCQM), please describe any efforts to develop an eMeasure (eCQM).

N/A

3b.3. If this is an eMeasure, provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL. Please also complete and attach the NQF Feasibility Score Card.

Attachment:

3c. Data Collection Strategy

Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, costs associated with fees/licensing of proprietary measures) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use). For eMeasures, a feasibility assessment addresses the data elements and measure logic and demonstrates the eMeasure can be implemented or feasibility concerns can be adequately addressed.

3c.1. *Required for maintenance of endorsement.* Describe difficulties (as a result of testing and/or operational use of the measure) regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.

***IF instrument-based,* consider implications for both individuals providing data (patients, service recipients, respondents) and those whose performance is being measured.**

This measure uses administrative claims data and, as such, imposes no data collection burden to measure entities.

3c.2. Describe any fees, licensing, or other requirements to use any aspect of the measure as specified *(e.g., value/code set, risk model, programming code, algorithm)*.

N/A; there are no fees, licensing, or other requirements to use any aspect of this measure as specified.

4. Usability and Use

Extent to which potential audiences (e.g., consumers, purchasers, providers, policy makers) are using or could use performance results for both accountability and performance improvement to achieve the goal of high-quality, efficient healthcare for individuals or populations.

4a. Accountability and Transparency

Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

4.1. Current *and* Planned Use

NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement in addition to performance improvement.

Specific Plan for Use	Current Use (for current use provide URL)
Not in use	Payment Program Medicare Shared Savings Program https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram

4a1.1 For each CURRENT use, checked above (update for *maintenance of endorsement*), provide:

- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included
- Level of measurement and setting

Program Name, Sponsor: Medicare Shared Savings Program (SSP), Centers for Medicare and Medicaid Services (CMS)

Purpose: The Medicare SSP was established by Section 3022 of the Affordable Care Act. The SSP is a key component of the Medicare delivery system reform initiatives included in the Affordable Care Act and is a new approach to the delivery of health care. Through ACOs, the SSP facilitates coordination and cooperation among providers to improve the quality of care for Medicare FFS beneficiaries and lower the growth in Medicare expenditures. Eligible providers, hospitals, and suppliers may participate in the SSP by creating or participating in an ACO.

Level of measurement and setting: Medicare Accountable Care Organizations

Geographic area and number/percentage of accountable entities and patients included: As of January 2020, there are 517 SSP ACOs with over 11 million assigned beneficiaries across the 50 states, Puerto Rico, and Washington DC. An ACO may serve patients across multiple regions. ACOs include networks of individual practices, group practices, hospital/professional partnerships, hospitals employing ACO professionals, federally qualified health centers, rural health clinics, and critical access hospitals. An ACO may report multiple of these characteristics.

4a1.2. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons? (*e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?*)

The measure as originally specified is currently in use. The updated measure is not yet in use; CMS has proposed to include this updated measure in the APM Performance Pathway quality measure set to be reported on by Medicare ACOs (measure name as proposed: "All-Cause Unplanned Admissions for Patients with Multiple Chronic Conditions") (85 FR 50286).

4a1.3. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement. (*Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.*)

The measure as originally specified is currently in use; the updated measure will replace the original measure in the Medicare Shared Savings Program beginning with Performance Year 2021 if finalized by CMS.

4a2.1.1. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.

How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.

N/A; the updated measure is not yet in use.

4a2.1.2. Describe the process(es) involved, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.

N/A; the updated measure is not yet in use.

For the previous version of the measure, CMS provided the following to ACOs:

1. Performance results in Annual Quality Reports; over Shared Savings Program ACOs receive the results each year. These reports also contain the benchmark performance rates, national mean of all ACO performance rates, prior year performance rate (if applicable), and whether the ACO's performance rate represents a significant improvement from the prior performance year.
2. Detailed specifications on measure calculation and the calculation of benchmarks are on the CMS website (Shared Savings Program: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/program-guidance-and-specifications.html; Next Generation ACOs via CMMI Connect: https://app.innovation.cms.gov/CMMIConnect/s/login/). Measure Information Forms (MIFs) containing detailed information and codes are published and updated annually. Detailed specifications are updated at least once annually, and calculations of benchmarks are updated every other year.
3. Educational webinars: As needed, the production contractor hosts a webinar in the late spring/early summer that covers the quality measures and how they are calculated and a webinar in the late summer/early fall to review the measure results. During these webinars, ACOs may ask the production contractor and CMS questions about the measures. ACOs may also submit questions to either the Model/Program-specific mailbox or the Quality Payment Program Service Center for a written response.

ACOs are not required to collect/submit data for this measure (beyond their usual billing practices); therefore, it is not necessary for CMS to provide an explanation of the processes of collecting and submitting data.

4a2.2.1. Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1.

Describe how feedback was obtained.

N/A; the updated measure is not yet in use.

For the previously used measure, ACOs had the opportunity to ask the production contractor and CMS questions about the measure during webinars or submit questions to either the Model/Program-specific mailbox or the Quality Payment Program Service Center. The production contractor and CMS provided responses in writing.

4a2.2.2. Summarize the feedback obtained from those being measured.

N/A; the updated measure is not yet in use.

For the previously used measure, CMS has received some feedback on measure performance or implementation of the previously implemented measure from any recipients of the measures' performance rates. In 2019 and 2020 during rulemaking, commenters have suggested CMS provide more actionable information to ACOs as part of their quality reports, such as the number of patients included in the numerator/denominator and the patients included. Questions related to interpretation of the measure performance rate have been answered primarily using resources provided to ACOs as described above, and CMS' Technical Assistance to ACOs including question-and-answer support.

4a2.2.3. Summarize the feedback obtained from other users

For the updated measure, CMS had added it to the 2019 Measure under Consideration list for review by the Measure Applications Partnership (MAP) Clinician Workgroup. The MAP final recommendation for this measure was "conditional support for rulemaking," with the condition of submission to the NQF for endorsement review. This updated measure, as documented in this application, is being submitted to the NQF for endorsement review.

For the previously used measure, during CMS Learning Collaborative Webinars, successful ACOs have presented to peers on the use of admission measures as part of internal quality improvement initiatives. ACOs have expressed that tracking to admission rates is a useful monitoring approach

4a2.3. Describe how the feedback described in 4a2.2.1 has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.

N/A; the updated measure is not yet in use.

Improvement

Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated. If not in use for performance improvement at the time of initial endorsement, then a credible rationale describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

4b1. Refer to data provided in 1b but do not repeat here. Discuss any progress on improvement (trends in performance results, number and percentage of people receiving high-quality healthcare; Geographic area and number and percentage of accountable entities and patients included.)

If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

Note that the updated measure, as specified, is currently not in use therefore we cannot demonstrate if there has been improvement with the updated measure.

4b2. Unintended Consequences

The benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such evidence exists).

4b2.1. Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.

We did not identify any unexpected findings during the implementation of the previously used measure. However, we are committed to monitoring the updated measure's use and assessing potential unintended consequences over time, such as the inappropriate shifting of care, increased patient morbidity and mortality, and other negative unintended consequences for patients.

4b2.2. Please explain any unexpected benefits from implementation of this measure.

N/A

5. Comparison to Related or Competing Measures

If a measure meets the above criteria **and** there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

5. Relation to Other NQF-endorsed Measures

Are there related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.

Yes

5.1a. List of related or competing measures (selected from NQF-endorsed measures)

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

5.1b. If related or competing measures are not NQF endorsed please indicate measure title and steward.

5a. Harmonization of Related Measures

The measure specifications are harmonized with related measures;

OR

The differences in specifications are justified

5a.1. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):

Are the measure specifications harmonized to the extent possible?

Yes

5a.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.

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. Competing Measures

The measure is superior to competing measures (e.g., is a more valid or efficient way to measure);

OR

Multiple measures are justified.

5b.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):

Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)

N/A

Appendix

A.1 Supplemental materials may be provided in an appendix. All supplemental materials (such as data collection instrument or methodology reports) should be organized in one file with a table of contents or bookmarks. If material pertains to a specific submission form number, that should be indicated. Requested information should be provided in the submission form and required attachments. There is no guarantee that supplemental materials will be reviewed.

No appendix **Attachment:**

Contact Information

Co.1 Measure Steward (Intellectual Property Owner): Centers for Medicare & Medicaid Services

Co.2 Point of Contact: Helen, Dollar-Maples, Helen.Dollar-Maples@cms.hhs.gov, 410-786-7214-

Co.3 Measure Developer if different from Measure Steward: Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation (CORE)

Co.4 Point of Contact: Doris, Peter, Dor.peter@yale.edu, 203-764-5700-

Additional Information

Ad.1 Workgroup/Expert Panel involved in measure development

Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.

The CORE measure reevaluation team met regularly and is comprised of experts in epidemiology, internal medicine, quality outcomes measurement, and measure development.

CORE Measure Reevaluation Team:

Kasia J Lipska, MD MHS – Project Lead

Faseeha K. Altaf, MPH – Project Manager

Craig S. Parzynski, MS – Supervising Analyst

Andrea G. Barbo, MS – Lead Analyst

Mariana Henry, MPH – Research Associate

Alex Ferrante, BS – Research Associate

Zhenqiu Lin, PhD – Analytics Director

Megan LoDolce, MA – Contract Manager

Elizabeth E. Drye, MD, SM* – Project Director

*Yale School of Medicine

For original measure development, CORE convened a TEP of clinicians, patients, purchasers, and experts in quality improvement to provide input on key methodological decisions.

Technical Expert Panel (TEP) Members included:

Lawrence M. Becker, BS- Xerox Corporation (Director, Strategic Partnerships, Alliances and Analytics)

Alex Blum, MD, MPH- Evergreen Health Cooperative (Chief Medical Officer)

Sanjay Doddamani, MD- Geisinger Health System (System-wide Chief of Advanced Cardiac Disease Heart Failure)

Kevin Fiscella, MD, MPH- University of Rochester Medical Center (Professor of Family Medicine)

Elbert Huang, MD, MPH- University of Chicago (Associate Professor of Medicine, Director of the Center for Translational and Policy Research of Chronic Diseases, and Associate Director of the Chicago Center for Diabetes Translation Research)

Bruce Leff, MD- Johns Hopkins University School of Medicine (Professor of Medicine, Division of Geriatric Medicine); The Johns Hopkins University Bloomberg School of Public Health (Faculty, Health Services Research Development Center and Lipitz Center for Integrated Health Care)

Andy Miller, MD, MPH- Healthcare Quality Strategies, Inc. (Medical Director);Colorado Foundation for Medical Care (CMO, Integrating Care for Populations & Communities National Coordinating Center)

Ami Parekh, MD, JD- University of California, San Francisco (Medical Director for Health System Innovation)

Christine Ritchie, MD- University of California, San Francisco (Professor of Medicine, Division of Geriatrics)

Two patient representatives

For the MCC measure, on which the updated ACO specifications are derived, CORE convened a TEP comprised of 20 members, including clinicians, patients, and experts in quality improvement to provide input on key methodological decisions.

TEP members:

1. Mary Barton, MD, MPP; Vice President, Performance Measurement; National Committee for Quality Assurance; Washington, D.C.
2. Larry Becker, BS; Director, Strategic Partnerships, Alliances and Analytics (Retired); Xerox; Rochester, NY
3. Jacob Berman, MD, MPH; Medical Director; General Internal Medicine Center, University of Washington; Seattle, WA
4. Jane Brock, MD, MSPH; Clinical Director; Quality Innovation Network – Quality Improvement Organization National Coordinating Center, Telligen; Greenwood Village, CO
5. Brenda Cook, MSN, RN, NEA-BC; Nursing Director; Southcentral Foundation; Anchorage, AK
6. Namirah Jamshed, MBBS; Associate Professor, Division of Geriatric Medicine; University of Texas Southwestern Medical Center; Dallas, TX
7. Lorie Joseph; Patient
8. David Kraus, MD; Advanced Heart Failure and Cardiac Transplant Specialist; Stern Cardiovascular Center; Memphis, TN
9. Rozalina McCoy, MD, MS; Assistant Professor of Medicine; Mayo Clinic; Rochester, MN
10. J. Michael McWilliams, MD, PHD; Associate Professor, Health Care Policy; Harvard Medical School; Cambridge, MA
11. Amy Mullins, MD, CPE, FAAFP; Medical Director, Quality Improvement; American Academy of Family Physicians; Leawood, KS
12. Diane Padden, PhD, CRNP, FAANP; Vice President, Professional Practice & Partnerships; American Association of Nurse Practitioners; Austin, TX
13. Robert Roca, MD, MPH, MBA; Vice President/Medical Director; Sheppard Pratt Health System/American Psychiatric Association; Baltimore, MD
14. Jason Sico, MD, MHS, FAHA, FACP; Assistant Professor of Neurology and Internal Medicine; Yale School of Medicine; New Haven, CT
15. Mary Smith, DNP, FNP-BC, ONP-C, RNFA; Nurse Practitioner; Starkville Orthopedic Clinic; Starkville, MS

16. Barbara Spivak, MD; President; Mount Auburn Cambridge Independent Practice Association; Brighton, MA
17. Jennefer Watson, Patient Caregiver; Jacksonville, FL

Daniel Weiner, MD, MS; Associate Professor of Medicine; Tufts University School of Medicine; Boston, MA

18. Roger Wells, PA-C; Family Practice and Emergency Medicine Physician Assistant; Howard County Medical Center; St. Paul, NE
19. Stephanie Wolf-Rosenblum, MD, MMM, FACP, FCCP; Physician Administrator and Vice President of Development and External Affairs; Southern New Hampshire Health System; Nashua, NH

Patient; Participation was confidential

Measure Developer/Steward Updates and Ongoing Maintenance

Ad.2 Year the measure was first released:

Ad.3 Month and Year of most recent revision:

Ad.4 What is your frequency for review/update of this measure? Not applicable.

Ad.5 When is the next scheduled review/update for this measure?

Ad.6 Copyright statement: Not applicable.

Ad.7 Disclaimers: Not applicable.

Ad.8 Additional Information/Comments: Not applicable.