# 2024 Pre-Rulemaking Measure Review
# Preliminary Assessment

| MUC ID | Title |
|---|---|
| MUC2024-043 | Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Ischemic Stroke Hospitalization with Claims-Based Risk Adjustment for Stroke Severity |
| **Measure Steward & Developer** | **Proposed CMS Programs** |
| Centers for Medicare & Medicare Services (CMS) | Hospital Inpatient Quality Reporting Program; Hospital Value-Based Purchasing Program |

| Measure Overview |
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| **Developer-provided rationale:** The goal of this measure is to improve patient outcomes by providing patients, physicians, hospitals, and policymakers with information about hospital-level, risk-standardized mortality rates following hospitalization for acute ischemic stroke. Measurement of patient outcomes allows for a broad view of quality of care that encompasses more than what can be captured by individual process-of-care measures. Complex and critical aspects of care, such as communication between providers, prevention of and response to complications, patient safety, and coordinated transitions to the outpatient environment, all contribute to patient outcomes but are difficult to measure by individual process measures. The goal of outcome measurement is to risk adjust for patient conditions at the time of hospital admission and then evaluate patient outcomes. This measure was developed to identify institutions whose performance is better or worse than would be expected based on their patient case mix and, therefore, promote hospital quality improvement and better inform consumers about care quality. |
| **CMS-provided program rationale:** CMS is considering modifying the existing version of this measure that is currently in use in the Hospital IQR Program with this re-specified version. including this quality measure into quality reporting programs as the measure supports the CMS's long-standing effort to link Medicare payments to health care quality in the inpatient hospital setting. This re-specified hospital-level, risk-standardized complication rate quality measure is going through the Measures Under Consideration (MUC) process to include Medicare Advantage (MA) beneficiaries to help ensure that within CMS quality reporting programs, quality measurement is tracked across all Medicare beneficiaries and not just the fee-for-service (FFS) population. The measure is also undergoing a modification of the reporting period, decreasing from 3 years to a 2-year performance period. This change will assist hospitals in providing more recent data on performance to assist in quality-improvement tactics. The continued inclusion of this quality measure in a quality reporting |

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| Measure Overview |
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| program will help the agency move one step closer to achieving its strategic quality initiatives of improving quality and health outcomes across the care journey and enabling a responsive and resilient health care system to improve quality. |
| **Description:** The measure estimates the hospital-level, risk-standardized mortality rate (RSMR) for patients discharged from the hospital with a principal discharge diagnosis of acute ischemic stroke. The outcome is all-cause 30-day mortality, defined as death from any cause within 30 days of the index admission date, including in-hospital death, for stroke patients. The measure includes the National Institutes of Health (NIH) Stroke Scale as an assessment of stroke severity upon admission in the risk-adjustment model. This measure uses Medicare fee-for-service (FFS) and Medicare Advantage (MA) administrative claims for the cohort derivation, outcome, and risk adjustment. |
| **Measure background:** Measure currently used in a Medicare program, but the measure is undergoing substantive changes. |
| **Numerator:** The outcome for this measure is 30-day, all-cause mortality. We define mortality as death from any cause within 30 days of the start of the admission for patients discharged from the hospital with a principal discharge diagnosis of ischemic stroke.<br><br>**Exclusions:** None |
| **Denominator:** The cohort includes admissions for patients that meet all of the following inclusion criteria:<br><br>1. Discharged from the hospital with a principal discharge diagnosis of ischemic stroke;<br>2. Enrolled in Medicare fee-for-service (FFS) and/or Medicare Advantage (MA) for the 12 months prior to the date of admission; and enrolled in FFS or MA during the index admission;<br>3. Aged 65 or over;<br>4. Not transferred from another acute care facility.<br><br>**Exclusions:** This measure excludes index admissions for patients that meet any of the following exclusion criteria:<br><br>1. Inconsistent or unknown vital status or other unreliable demographic data (e.g., age and gender);<br>2. Enrolled in the Medicare hospice program any time in the 12 months prior to the index admission, including the first day of the index admission; or<br>3. Discharged against medical advice;<br>4. With a secondary diagnosis code of COVID-19 coded as present on admission on the index admission claim.<br><br>For patients with more than one eligible stroke admission in the reporting period, only one index admission is randomly selected for inclusion in the cohort. Additional admissions within that time period are excluded.<br><br>**Exceptions:** None |

| Measure Overview | |
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| **Measure type:** Outcome | **Measure has multiple scores:** No<br>**Measure is a composite:** No<br>**Measure is digital and/or an eCQM:** No<br>**Measure is a paired or group measure:** No |
| **Level of analysis:** Facility | **Data source(s):** Digital-Administrative systems: Administrative Data (non-claims); Digital-Administrative systems: Claims Data |
| **Care setting(s):** Hospital inpatient acute care facility | **Risk adjustment or stratification:** Yes |
| **CBE endorsement status:** Not endorsed | **CBE endorsement history:** Failed endorsement or decision to not endorse (for more context on the status and rulemaking history, please refer to the "MUC2024-043-Rationale" submission attachment. |
| **Is measure currently used in CMS programs?** Yes, Hospital Inpatient Quality Reporting Program. | **Measure addresses statutorily required area?** No |

## Meaningfulness

| Importance | |
|---|---|
| **Type of evidence:** | Peer-Reviewed Original Research; Empirical Data; Grey Literature [Source: Measures Under Consideration (MUC) Entry/Review Information Tool (MERIT) Submission Form] |
| **Importance:** The developer reported performance scores as a rate across 3,830 hospitals: min., 7.28; 10th percentile, 11.12; median, 12.76; mean, 13.18; 90th percentile, 15.44; max., 37.27; standard deviation, 2.07. Developer also cites mortality rates following discharge for stroke between 8.0% and 21.9% for patients admitted for stroke July 2019-June 2022, demonstrating a gap in performance.<br><br>An estimated 795,000 people have a stroke each year, and stroke is the nation's fifth leading cause of death. Strokes are also expensive, at an estimated cost of $34 billion per year. Substantial empirical evidence demonstrates that hospital care processes, such as speediness and organization of care, coordinated transitions to outpatient care, antihypertensive and anticoagulant therapies, and appropriate imaging, can influence post-stroke mortality rates. Hospitals have also been shown to influence stroke outcomes through activities such as participation in care registries. [Source: Evidence Attachment]<br><br>Developer reports that two out of two patient representatives on the technical expert panel (TEP) agreed that the measure is meaningful and produces information that is valuable in making care decisions. | |
| **Rating:** Met | |

### Measure Performance

The importance data provided (3,830 hospitals) corresponds to Table 4.7.5 in the Supplemental Methodology Report, which includes hospitals with at least 25 admissions. Because reliability has been calculated on hospitals with at least 25 admissions, Battelle used the mean and standard deviation from Table 4.7.6 ("with ICD-10-based risk variables" columns) to estimate the importance deciles (i.e., the data sorted and broken into 10 equal parts) in Table 1 below (for simplicity, a normal distribution was assumed).

Interpretation: The mean score for the 2,446 entities described in the testing submission for this measure was 13.0. For this ratio measure, a lower score indicates better quality of care.

**Table 1. MUC2024-043 Performance Score Deciles**

| | Overall | Min | Decile 1 | Decile 2 | Decile 3 | Decile 4 | Decile 5 | Decile 6 | Decile 7 | Decile 8 | Decile 9 | Decile 10 | Max |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean Score (SD) | 13.0 (2.3) | 5.3 | 9.2 | 10.6 | 11.4 | 12.1 | 12.7 | 13.3 | 13.9 | 14.6 | 15.4 | 16.8 | 20.7 |
| Number of Entities | 2,446 | 1 | 244 | 245 | 245 | 244 | 245 | 245 | 244 | 245 | 245 | 244 | 1 |

| **Conformance** |
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| **Measure alignment with conceptual intent:** This measure's specification is appropriate and aligned with the measure focus (30-day, all-cause mortality) among Enrolled in Medicare fee-for-service (FFS) and/or Medicare Advantage (MA) patients age 65 or older discharged from the hospital with a principal discharge diagnosis of ischemic stroke. Numerator and denominator populations are appropriate and exclusions align with clinical evidence. |
| **Rating:** Met |

| **Feasibility** | |
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| **eCQM feasibility testing conducted:** | No [Source: MERIT Submission Form] |
| **Feasibility:** All data elements exist in defined fields in electronic sources, but the developer did not assess United States Core Data for Interoperability (USCDI)/USCDI+ quality alignment. Aligning with USCDI standards for data elements can promote interoperability and improve feasibility. No modifications to provider workflow are necessary based on responses to MERIT Submission form. | |
| **Rating:** Met | |

| Validity | |
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| **Validity testing:** | Empiric Validity; Face Validity [Source: MERIT Submission Form; TEP Summary Report; Supplemental Methodology Report] |
| **Testing level(s):** | Facility |
| **Validity:** The developer tested empiric validity in a sample of 1,966 facilities with at least 25 admissions between January 1, 2022, and December 30, 2022, following the addition of Medicare Advantage admissions and revision of the risk model, by evaluating the measure's correlation with three quality metrics. The stroke mortality measure and the Star Rating Standardized Summary Scores (excluding stroke mortality) and the Star Rating Standardized Summary Scores (excluding mortality measure group) were calculated on the same set of 1,997 hospitals and the correlations were –0.21 and –0.11, respectively. This is in the hypothesized direction because lower stroke mortality rate and higher Star Rating reflect better quality of care.<br>While all three correlation tests were in the hypothesized direction (higher complications should lead to lower Star Ratings) and statistically significant, the correlation coefficients were weak.<br><br>The developer evaluated face validity by soliciting responses to the statement that the measure "as specified can be used to distinguish between better and worse quality hospitals," using a Likert scale. Overall, 11 of 12 TEP members agreed with this statement, with four strongly agreeing, six moderately agreeing, and one somewhat agreeing. | |
| **Threats to validity:** During the most recent maintenance endorsement, the developer revised the risk model using a redefined set of risk factors. The developer reports they utilized individual ICD-10 codes instead of hierarchical condition categories [Source: Supplemental Methodology Report]. A key focus for the TEP meetings held in 2020-2022 was to help select risk factors and evaluate face validity for the revised risk model [Source: TEP Summary Report]. In addition, the developer responded to comments from stakeholders and evidence that stroke severity is an important predictor of mortality by including the National Institutes of Health Stroke Scale (NIHSS) in the risk-adjustment model [Source: Evidence Attachment]. C-statistic shows good model calibration and consistent performance over time; the developer performed sufficient statistical testing to support model. | |
| **Rating:** Met | |

| Reliability | |
|---|---|
| **Reliability testing method(s):** | Signal-to-Noise [Source: MERIT Submission Form; TEP Summary Report; Supplemental Methodology Report] |
| **Testing level:** | Facility |
| **Reliability discussion:** The numerator and denominator for this measure are well defined. The developer seems to be calculating signal-to-noise reliability based on the between entity variance from the risk-adjustment model. The developer noted that the reliability provided in the measure submission was calculated for the hospital intercepts from the risk-adjusted model and not the final measure (as could be accomplished through alternative methods such as random split-half). This calculation method's constraints include potentially limited ability to account for real-world variation across entities. | |

| Reliability |
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| The reliability results provided (which represent the reliability of the predicted value only) were calculated from 1 year of data consisting of 2,446 hospitals with at least 25 admissions. The developer projected the reliability for 2-year data and provided estimated minimum, maximum, median, and 25th and 75th percentiles. Battelle interpolated these estimates to estimate deciles of reliability (Table 2). For the 2-year projections, about 100% of the entities would have a reliability >0.6, indicating that all entities have acceptable reliability. For the predicted reliability values, the result indicates that this measure is capable of differentiating entities by quality of performance. |
| **Additional reliability analyses:** Table 2 includes the minimum, maximum, and 25th and 75th percentiles provided. Deciles have been filled in with simple interpolation. |
| **Rating:** Met |

## Reliability

Table 2 shows deciles by reliability based on the information provided for the performance score (Table 4.7.6 in the Supplemental Methodology Report) and calculated reliability for the 2,446 entities described in the testing submission. Battelle created this table to provide reviewers with a standardized format to assess reliability.

Interpretation: For the 2-year projections, about 100% of the entities would have a reliability >0.6, indicating that all entities have acceptable reliability. For the predicted reliability values, the result indicates that this measure is capable of differentiating entities by quality of performance.

**Table 2. MUC2024-043 Mean Reliability (by Reliability Decile)**

| Mean | SD | Min | Decile 1 | Decile 2 | Decile 3 | Decile 4 | Decile 5 | Decile 6 | Decile 7 | Decile 8 | Decile 9 | Decile 10 | Max | IQR |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0.90 | 0.10 | 0.612 | 0.65 | 0.73 | 0.81 | 0.83 | 0.86 | 0.91 | 0.93 | 0.95 | 0.96 | 0.98 | 0.993 | 0.14 |

| Usability | |
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| **Usability considered in application:** | Yes |
| **Usability discussion:** Developer did not indicate whether input was collected from accountable entities in the submission, and the TEP summary report attachment does not appear to address the question of usability. However, this measure is currently in use in the HIQR program, and the developer reports that no unintended consequences have been identified, which indicates a level of usability for the measure. | |
| **Rating:** Met | |

| External Validity | |
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| **Was this measure tested in the same target population as the CMS program?** | Yes |
| **External validity discussion:** This target population for this measure is Medicare fee-for-service and Medicare Advantage patients, and the developer tested it in hospital inpatient acute care facilities providing neurology services. The measure is currently in use in one of the proposed Medicare programs (HIQR). | |
| **Rating:** Met | |

## Appropriateness of Scale

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| **Similar or related measures in program(s):** | • CBE ID 3502: Hybrid Hospital-Wide (All-Cause, All-Procedure) Risk-Standardized Mortality (HWM)<br>• CBE ID 3504: Claims-Only Hospital-Wide (All-Cause, All-Procedure) Risk-Standardized Mortality (HWM)<br>• CBE ID 0467: Acute Stroke Mortality Rate (IQI 17) |
| **Measure appropriateness, equity, and value across target populations/measured entities:** Developer states that the proposed measure is distinct from the all-cause hospital-wide mortality measures (CBE 3502 and 3504) because it is specific to stroke. They also state that the proposed measure is different from the acute stroke mortality rate (CBE 0467) because it addresses a somewhat different population by including Medicare Advantage patients and additionally includes a risk adjustment for NIHSS. The committee should consider if, based on their professional and patient experience, there is a chance for variation on distribution of benefit or burden across provider and patient populations. | |

## Time to Value Realization

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| **Plan for near- and long-term impacts after implementation:** | Measure impacts cited include improved health status, improved health care management and support, and reduced cost and risk of death. |
| **Measure implementation impacts over time:** While the measure developer briefly mentions potential outcomes for their measure on patient populations, there may be a need for further examination of near- and long-term impacts of this measure after implementation across multiple levels.<br><br>Questions for the committee to consider:<br>• What are the potential near- and long-term impacts of this measure on measured entities, the proposed programs (HVBP and HIQR) and patient populations?<br>• How will this measure mature through revisions in the future if added to the programs' measure sets? | |