



Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item 1b.1 relates to sub criterion 1b).

Brief Measure Information

NQF #: 3504

Corresponding Measures:

De.2. Measure Title: Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

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

De.3. Brief Description of Measure: The measure estimates a hospital-level 30-day hospital-wide risk-standardized mortality rate (RSMR), defined as death from any cause within 30 days after the index admission date, for Medicare fee-for-service (FFS) patients who are between the ages of 65 and 94.

Please note that in parallel with the claims-only HWM measure, we are submitting a hybrid HWM measure. Note that ultimately the claims and hybrid measures will be harmonized and use the same exact cohort specifications. The intent is that prior to implementation, the two measures will be exactly the same, with the exception of the additional risk adjustment added by the CCDE in the hybrid measure. This is analogous to the currently endorsed and implemented hybrid hospital-wide readmissions measure (NQF 1789 and NQF 2879e).

Because of the homology between the claims and hybrid HWM measures, there is no reason to suspect that the results of analyses done for the claims-only measure would differ in any significant way from results of analyses for a nationally representative hybrid measure.

Below we highlight the differences between the two measures, including specifications, data used, and testing which reflect limitations of data availability, as well as actual intended differences in the measure (risk adjustment).

Differences in the measure, data, and testing that reflect limitations in data availability

1. Dataset used for development, some testing (see below for differences), and measure results:
 - a. The claims-only measure uses nation-wide Medicare FFS claims and the enrollment database.
 - b. The hybrid measure uses an electronic health record (EHR) database from 21 hospitals in the Kaiser Permanente network which includes inpatient claims data information.
2. Age of patients in cohort:
 - a. The claims-only measure includes Medicare FFS patients, age 65-94.
 - b. The hybrid measure includes all patients age 50-94 (see later discussion for justification)
3. External empiric validity testing
 - a. Not possible for the hybrid measure, due to limited data availability. We provide results from the claims-only measure within the hybrid testing form.
4. Socioeconomic risk factor analyses
 - a. Not possible for the hybrid measure, due to limited data availability. We provide results from the claims-only measure within the hybrid testing form.
5. Exclusion analyses
 - a. To be representative of what we expect the impact would be of the measures' exclusions in a nation-wide sample, we provide the results from the claims-only measure.
6. Meaningful differences
 - a. To be representative of what we expect the range of performance would be in a nation-wide sample, we provide the distribution results from the claims-only measure.

Difference between the two measures when fully harmonized, prior to implementation:

1. Risk adjustment:

- a. The claims-only measure uses administrative claims data only for risk adjustment
- b. The hybrid measure adds 10 clinical risk variables, derived from a set of core clinical data elements (CCDE) extracted from the EHR.
- 1b.1. Developer Rationale:** The goal of this measure is to improve patient outcomes by providing patients, physicians, hospitals, and policy-makers with information about hospital-level, risk-standardized mortality rates following hospitalization for a range of medical conditions and surgical procedures. 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 outcomes measurement is to risk adjust for patients' 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. The more granular division-level results can support the targeting of service-line quality improvement.

Mortality is a significant outcome that is meaningful to patients and providers. For the majority of Medicare beneficiaries admitted to acute care hospitals in the US, the goal is to avoid short-term mortality. According to recent internal analyses, from July 2016 to June 2017, there were about 10 million inpatient admissions among Medicare FFS beneficiaries between the ages of 65 and 94, at 4,700 US hospitals. The observed mean 30-day mortality rate was 8.17%. The range of mortality scores on the HWM measure from 4692 acute-care hospitals was 3.95%-8.70% across more than 4.3 million admissions.

S.4. Numerator Statement: The outcome for this measure is 30-day, all-cause mortality. Mortality is defined as death from any cause, either during or after admission, within 30 days of the index admission date.

S.6. Denominator Statement: The cohort includes inpatient admissions for a wide variety of conditions for Medicare FFS patients aged between 65 and 94 years old who were admitted to short-term acute care hospitals. If a patient has more than one admission during the measurement year, one admission is randomly selected for inclusion in the measure. Additional details are provided in S.7 Denominator Details.

S.8. Denominator Exclusions: The measure excludes index admissions for patients:

1. With inconsistent or unknown vital status (from claims data) or other unreliable claims data;
2. Discharged against medical advice (AMA);
3. With an admission for spinal cord injury (CCS 227), skull and face fractures (CCS 228), Intracranial Injury (CCS 233), Crushing injury or internal injury (CCS 234), Open wounds of head/neck/trunk (CCS 235), and burns (CCS 240); and
4. With a principal discharge diagnosis within a CCS with fewer than 100 admissions within the measurement year.

De.1. Measure Type: Outcome

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

S.20. Level of Analysis: Facility

IF Endorsement Maintenance – Original Endorsement Date: Oct 23, 2019 **Most Recent Endorsement Date:**

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?

1. Evidence, Performance Gap, Priority – 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

[Del19b1HOP5HWMClaimsEvidenceForm022819.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.

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.

The goal of this measure is to improve patient outcomes by providing patients, physicians, hospitals, and policy-makers with information about hospital-level, risk-standardized mortality rates following hospitalization for a range of medical conditions and surgical procedures. 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 outcomes measurement is to risk adjust for patients' 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. The more granular division-level results can support the targeting of service-line quality improvement.

Mortality is a significant outcome that is meaningful to patients and providers. For the majority of Medicare beneficiaries admitted to acute care hospitals in the US, the goal is to avoid short-term mortality. According to recent internal analyses, from July 2016 to June 2017, there were about 10 million inpatient admissions among Medicare FFS beneficiaries between the ages of 65 and 94, at 4,700 US hospitals. The observed mean 30-day mortality rate was 8.17%. The range of mortality scores on the HWM measure from 4692 acute-care hospitals was 3.95%-8.70% across more than 4.3 million admissions.

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.*

We conducted analyses using data from July 2016 to June 2017 Medicare claims data (4,335,530 admissions from 4692 hospitals). In the study cohort, the mean hospital-level risk standardized mortality rate (RSMR) was 6.85%, with a range of 3.95%-8.70%. As shown below, the median RSMR was 6.93% (25th and 75th percentiles were 6.66% and 7.09%, respectively).

RSMR Distribution:

Min, 3.95%
1st, 5.57%
5th, 6.07%
10th, 6.32%
25th, 6.66%
50th, 6.93%
75th, 7.09%
90th, 7.26%
95th, 7.40%
99th, 7.75%
Max, 8.70%

Below we provide RSMRs by decile of performance for the Overall RSMR

Decile: Min (RSMR)-Max (RSMR)

- 1: 3.95%-6.32%
- 2: 6.32%-6.58%
- 3: 6.58%-6.74%
- 4: 6.74%-6.85%
- 5: 6.85%-6.93%
- 6: 6.93%-6.99%
- 7: 6.99%-7.05%
- 8: 7.05%-7.13%
- 9: 7.13%-7.26%
- 10: 7.26%-8.70%

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.

Mortality is a significant outcome that is meaningful to patients and providers, and the vast majority of patients admitted to the hospital have survival as a primary goal. For the majority of Medicare beneficiaries admitted to acute care hospitals in the US, the goal is to avoid short-term mortality. According to recent internal analyses, from July 2016 to June 2017, there were about 10 million inpatient admissions among Medicare FFS beneficiaries between the ages of 65 and 94, at 4,700 US hospitals. The observed 30-day mortality rate was 8.17%.

Furthermore, estimates using data from 2002 to 2008 suggest that more than 400,000 patients die each year from preventable harm in hospitals.[1] While we do not expect mortality rates to be zero, studies have shown that mortality within 30 days of hospital admission is related to quality of care, and that high and variable mortality rates across hospitals indicate opportunities for improvement.[2,3]

In addition, hospital-wide mortality has been the focus of a number of previous quality reporting initiatives in the US and other countries. Prior efforts have met with some success and a number of challenges. Through our environmental scan and literature review, we identified multiple hospital-wide mortality measures reported at the state-level, and several at the health-system level. There is no hospital-wide mortality measure reported at the national-level in the United States.

While existing condition- and procedure-specific mortality measures provide specificity for targeted quality improvement work and may have contributed to national declines in hospital mortality rates for measured conditions (Suter et al., 2014), they do not, however, allow broader statements about a hospital's performance, nor do they meaningfully capture performance for small-volume hospitals. Further, existing mortality measures may not capture cross-cutting hospital-wide characteristics that also contribute to quality of care. These factors may be difficult to measure, such as a global culture of safety, good communication across teams, multidisciplinary care teams, coordination with community services and efforts, and effective care transitions.

References:

1. James JT. A new, evidence-based estimate of patient harms associated with hospital care. *Journal of patient safety*. 2013;9(3):122-128.
2. Peterson ED, Roe MT, Mulgund J, et al. Association between hospital process performance and outcomes among patients with acute coronary syndromes. *JAMA*. 2006;295(16):1912-1920.
3. Writing Group for the Checklist- I.C.U. Investigators, Brazilian Research in Intensive Care Network. Effect of a quality improvement intervention with daily round checklists, goal setting, and clinician prompting on mortality of critically ill patients: A randomized clinical trial. *JAMA*. 2016;315(14):1480-1490.
4. Suter LG, Li SX, Grady JN, et al. National patterns of risk-standardized mortality and readmission after hospitalization for acute myocardial infarction, heart failure, and pneumonia: update on publicly reported outcomes measures based on the 2013 release. *Journal of general internal medicine*. Oct 2014;29(10):1333-1340.

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.

This analysis used Dataset 2, which included Medicare FFS claims from July 1, 2016 – June 30, 2017, with 4,692 hospitals and a total of 4,335,530 admissions (study cohort).

The distribution of patients with the dual eligible risk factor across measured hospitals was:

Median: 14.6%

Interquartile range: 9.2%-22.8%

Measure score (RSMR) percentile: bottom vs. top quartile for proportion of patients with dual eligible risk factor

Min: 4.28% vs. 4.50%

10th: 6.18% vs 6.21%

25th: 6.48% vs. 6.57%

Median: 6.73% vs. 6.8%

75th: 6.99% vs. 7.11%

90th: 7.31% vs. 7.44%

Maximum: 8.61% vs. 9.20%

The distribution of patients with the low SES AHRQ social risk factor across measured hospitals was:

Median: 17%

Interquartile range: 7.1%-34.2%

Measure score (RSMR) percentile: bottom vs. top quartile for proportion of patients with the low SES AHRQ social risk factor.

Min: 4.28% vs. 4.51%

10th: 6.22% vs 6.37%

25th: 6.55% vs. 6.61%

Median: 6.73% vs. 6.84%

75th: 7.03% vs. 7.19%

90th: 7.29% vs. 7.55%

Maximum: 8.37% vs. 9.20%

Please see section 2b3.4b of the testing form for an in-depth analysis of social risk factors.

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

N/A

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):

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

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

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.)

N/A

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 Attachment: Del18b1HOP5HWMClaimsDataDictionary01072019.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.

No

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.

N/A

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 30-day, all-cause mortality. Mortality is defined as death from any cause, either during or after admission, within 30 days of the index admission date.

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).

The measure outcome is death from any cause within 30 days of the admission date of the index admission, for Medicare FFS patients identified using the Medicare Enrollment Database (EDB). The numerator is a binary variable (1=yes/0=no) that indicates whether the patient died within 30 days of the index admission date.

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

The cohort includes inpatient admissions for a wide variety of conditions for Medicare FFS patients aged between 65 and 94 years old who were admitted to short-term acute care hospitals. If a patient has more than one admission during the measurement year, one admission is randomly selected for inclusion in the measure. Additional details are provided in S.7 Denominator Details.

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).

An index admission is the hospitalization to which the mortality outcome is attributed and includes admissions for patients:

1. Enrolled in Medicare FFS Part A for at least 12 months prior to the date of admission and during the index admission

Rationale: Claims data are consistently available only for Medicare FFS beneficiaries. The 12-month prior enrollment criterion ensures a full year of administrative data is available for risk adjustment.

2. Not transferred from another acute care facility

Rationale: Admissions to an acute care hospital within one day of discharge from another acute care hospital are considered transfers. Transferred patients are included in the measure cohort, but it is the initial hospitalization rather than any “transfer-in” hospitalization(s), that is included as the hospitalization to which the mortality outcome is attributed (the index admission).

3. Aged between 65 and 94 years

Rationale: Medicare patients younger than 65 are not included in the measure because they usually qualify for the program due to severe disability and are considered to be clinically distinct from Medicare patients 65 and over. Patients over age 94 are not included to avoid holding hospitals responsible for the survival of the very elderly patients, who may be less likely to have survival as a primary goal.

Note that the hybrid measure (submitted for NQF endorsement in parallel with the claims-only measure) differs from the claims-only measure in terms of the age range of included admissions; the hybrid measure includes all inpatient admissions for patients aged 50-94 years old. The intention is to fully harmonize the cohort definitions for the two measures, so that both measures will capture admissions for patients age 65-94. We deviated from that definition during development and testing for the hybrid measure due to the limited dataset available that included the EHR data elements needed to calculate the hybrid measure. Note that the risk model already includes age in years, as a risk variable.)

4. Not admitted for primary psychiatric diagnoses

Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric facilities that are not comparable to short-term acute care hospitals (see data dictionary, HWM Non-Acute Care Inclusion tab).

5. Not admitted for rehabilitation

Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care (see data dictionary, HWM Non-Acute Care Inclusion tab).

6. Not enrolled in hospice at the time of, or 12 months prior to, their index admission

Rationale: Patients enrolled in hospice in the prior 12 months or at the time of admission are unlikely to have 30-day survival as a primary goal.

7. Not enrolled in hospice within two days of admission

Rationale: There is not a single, correct approach regarding patients enrolled in hospice during admission or upon discharge – mortality may or may not represent a quality signal for this group of patients and hospice enrollment is inadequate to differentiate this issue. However, for most patients and/or families who had the discussion and agreed to enroll in hospice within two days of admission, 30-day survival is not likely the primary goal due to their condition and not the quality of care received.

8. Not with a principal diagnosis of cancer and enrolled in hospice during their index admission

Rationale: Patients admitted primarily for cancer who are enrolled in hospice during admission are unlikely to have 30-day survival

as a primary goal of care. (see data dictionary, HWM Cancer Inclusion tab).

9. Without any diagnosis of metastatic cancer

Rationale: Although some patients admitted with a diagnosis of metastatic cancer will have 30-day survival as a primary goal of care, for many such patients admitted to the hospital, death may be a clinically reasonable and patient-centered outcome. (see data dictionary, HWM Metastatic Cancer Inclusion tab).

10. Not with a principal discharge diagnosis, or a secondary diagnosis that is present on admission (POA) for a condition which hospitals have limited ability to influence survival

Rationale: Hospitals have little ability to impact mortality for some conditions. This list of conditions (see data dictionary, HWM ICD-10 Inclusion tab) was determined through independent review, by several clinicians, of conditions associated with high mortality. The decisions were also reviewed with our Technical Expert Panel (TEP) and Technical Work Group. Admissions are not included in the cohort if the patient had a principal diagnosis code that is on this list, or a secondary code with POA that is on the list.

In addition, for patients with multiple admissions, the measure selects only one admission, at random, for inclusion. There is no practical statistical modeling approach that can account or adjust for the complex relationship between the number of admissions and risk of mortality in the context of a hospital-wide mortality measure. Random selection ensures that providers are not penalized for a “last” admission during the measurement period; selecting the last admission would not be as accurate a reflection of the risk of death as random selection, as the last admission is inherently associated with a higher mortality risk. Random selection is also used in CMS’s condition-specific mortality measures. Note that random selection reduces the number of admissions, but does not exclude any patients from the measure.

The cohort is defined using ICD-10 Clinical Modification codes identified in Medicare Part A Inpatient claims data. The measure aggregates the ICD-10 principal diagnosis and all procedure codes of the index admission into clinically coherent groups of conditions and procedures (condition categories or procedure categories) using the Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications System (CCS). There is a total of 285 mutually exclusive AHRQ condition categories, most of which are single, homogenous diseases such as pneumonia or acute myocardial infarction. Some are aggregates of conditions, such as “other bacterial infections”. There is a total of 231 mutually exclusive procedure categories. Using the AHRQ CCS procedure and condition categories, the measure assigns each index hospitalization to one of 15 mutually exclusive divisions. The divisions were created based upon clinical coherence, consistency of mortality risk, adequate patient and hospital case volume for stable results reporting, and input from clinicians, patients, and patient caregivers on usability.

The measure first assigns admissions with qualifying AHRQ procedure categories to one of six surgery divisions by identifying a defining surgical procedure. The defining surgical procedure is identified using the following algorithm: 1) if a patient only has one major surgical procedure then that procedure is the defining surgical procedure; 2) if a patient has more than one major surgical procedure, the first dated procedure performed during the index admission is the defining surgical procedure; 3) if there is more than one major surgical procedure on that earliest date, the procedure with the highest mortality rate is the defining surgical procedure. These divisions include admissions likely cared for by surgical teams.

The surgical divisions are: Surgical Cancer (see note below), Cardiothoracic Surgery, General Surgery, Neurosurgery, Orthopedic Surgery, and Other Surgical Procedures.

For the Surgical Cancer division, any admission that includes a surgical procedure and a principal discharge diagnosis code of cancer is assigned to the Surgical Cancer division. This division and the logic behind it was implemented in response to feedback from our Technical Expert Panel.

The measure then assigns the remaining admissions into one of the nine non-surgical divisions based on the AHRQ diagnostic CCS of the principal discharge diagnosis. The non-surgical divisions are: Cancer, Cardiac, Gastrointestinal, Infectious Disease, Neurology, Orthopedic, Pulmonary, Renal, Other Conditions.

The full list of the specific diagnosis and procedure AHRQ CCS categories used to define the divisions are attached in the Data Dictionary.

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

The measure excludes index admissions for patients:

1. With inconsistent or unknown vital status (from claims data) or other unreliable claims data;
2. Discharged against medical advice (AMA);
3. With an admission for spinal cord injury (CCS 227), skull and face fractures (CCS 228), Intracranial Injury (CCS 233), Crushing injury

or internal injury (CCS 234), Open wounds of head/neck/trunk (CCS 235), and burns (CCS 240); and
4. With a principal discharge diagnosis within a CCS with fewer than 100 admissions within 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.)

1. With inconsistent or unknown vital status (from claims data) or other unreliable claims data

Rationale: The measure does not include stays for patients where the admission date is after the date of death in the Medicare Enrollment Database, or where the date of death occurs before the date of discharge but the patient was discharged alive because these are likely errors in the data.

2. Discharged against medical advice (AMA)

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. With an admission for spinal cord injury (CCS 227), skull and face fractures (CCS 228), Intracranial Injury (CCS 233), Crushing injury or internal injury (CCS 234), Open wounds of head/neck/trunk (CCS 235), and burns (CCS 240)

Rationale: Even though a hospital likely can influence the outcome of some of these conditions, in many cases death events are not a signal of poor quality of care when patients present with these conditions. These conditions are also infrequent events that are unlikely to be uniformly distributed across hospitals.

4. With a principal discharge diagnosis within a CCS with fewer than 100 admissions in that division within the measurement year.

Rationale: To calculate a stable and precise risk model, there are a minimum number of admissions that are needed. In addition, a minimum number of admissions and/or outcome events are required to inform grouping admissions into larger categories. These admissions present challenges to both accurate risk prediction and coherent risk grouping and are therefore excluded.

Note: During measure development we analyzed different volume cut-offs (25, 50 and 100). Using cut-off values below 100 resulted in too many CCS codes in some of the divisions (the CCS category codes are used in risk adjustment) which resulted in non-convergence of those division-level risk models. The total number of patients excluded is very small (13,597 or 0.21% of admissions for a cut off of 100). During measure development we also explored the option of pooling low-volume CCS codes (CCS<100 patients) into one group, however, the heterogeneity in mortality rates for the individual ICD-10 codes in those groups would preclude adequate risk adjustment. The TEP supported excluding these admissions.

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.)

N/A

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.)

The measure estimates hospital-level, risk-standardized mortality rates (RSMRs) within 30 days of hospital admission using hierarchical logistical regression models through a Bayesian Markov Chain Monte Carlo (MCMC) procedure. In brief, we used hierarchical logistic regression to model the log-odds of mortality for each of the 15 service-line divisions. Death within 30 days was modeled as a function of patient-level demographic and clinical characteristics and a random hospital-level intercept. This model specification accounts for within-hospital correlation of the observed outcomes and models the assumption that underlying

differences in quality among the health care facilities being evaluated lead to systematic differences in outcomes. We estimated a separate hierarchical logistic regression model for each service-line division. In order to obtain the variance and interval estimates, we fit the hierarchical model under the Bayesian framework along with the Markov Chain Monte Carlo (MCMC) technique. Admissions are assigned to one of 15 mutually exclusive divisions (groups of discharge condition categories and procedure categories). For each division and each hospital with patients in that division, the standardized mortality ratio (SMR) is calculated as the ratio of the number of “predicted” deaths to the number of “expected” deaths at a given hospital. The predicted number of deaths is based on the hospital’s performance with its observed case mix and service mix, and is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of mortality. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are transformed via an inverse logit function and summed over all patients attributed to a hospital to get a predicted value. The expected number of deaths is based on the nation’s performance with that hospital’s case mix and service mix and is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are transformed via an inverse logit function and summed over all patients in the hospital to get an expected value. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows a particular hospital’s performance, given its case mix and service mix, to be compared to an average hospital’s performance with the same case mix and service mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, while a higher ratio indicates higher-than-expected mortality rates or worse quality.

To assess hospital performance for each reporting period, the measure re-estimates the model coefficients using the data in that period.

The division-level SMRs are then pooled for each hospital using an inverse variance-weighted geometric mean to create a hospital-wide composite SMR. The hospital-wide SMR is then multiplied by the national observed mortality rate to produce the RSMR.

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.

N/A. This measure is not based on a sample.

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.

N/A. This measure is not based on a survey or patient-reported data.

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.

Data sources for the Medicare FFS measure:

1. Medicare Part A Inpatient: The index dataset contains administrative inpatient hospitalization data for Medicare FFS beneficiaries, aged 65-94 on admission, hospitalized from July 1, 2016-June 30, 2017. The history dataset includes administrative inpatient hospitalization data on each patient for the 12 months prior to the index admission.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. It was also used to determine hospice enrollment.

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)

Facility

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

Inpatient/Hospital If other:
S.22. <u>COMPOSITE Performance Measure</u> - Additional Specifications <i>(Use this section as needed for aggregation and weighting rules, or calculation of individual performance measures if not individually endorsed.)</i> N/A. This is not a composite performance measure.
2. Validity – See attached Measure Testing Submission Form Claims-Only_Hospital-Wide_Mortality_Public_Comment_Technical_Report.pdf,Del18b1HOP5HWMClaimsTestingForm01282019.docx 2.1 <u>For maintenance of endorsement</u> <i>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.</i> 2.2 <u>For maintenance of endorsement</u> <i>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.</i> 2.3 <u>For maintenance of endorsement</u> <i>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.</i>

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>(i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields)</i> Update this field for <u>maintenance of endorsement.</u> ALL data elements are in defined fields in a combination of electronic sources 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).

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.

N/A

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).

There are no fees associated with the use of this measure.

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)
Public Reporting	
Not in use	

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

This measure is not yet in public reporting.

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?)

See 4.a.1.3 below.

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.)

This measure may be included in the Hospital Inpatient Quality Reporting Program. CMS signaled, in the Inpatient Prospective Payment System (IPPS) proposed rule, the eventual possibility of including this measure (and/or the related hybrid measure) within the Inpatient Quality Reporting (IQR) program.

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 measure is currently not 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 measure is currently not in use.

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 measure is currently not in use.

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

N/A; the measure is currently not in use.

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

N/A; the measure is currently not in use.

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 measure is currently not 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.

This is a new measure and there is no information available on performance improvement. This measure is not currently used in a program, but a primary goal of the measure is to provide information necessary to implement focused quality improvement efforts. Once the measure is implemented, we plan to examine trends in improvements by comparing RSMRs over time.

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.

N/A The measure is currently not in use.

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

N/A The measure is currently not in use.

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)

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

Hospital-Wide All-Cause Risk-Standardized Readmission Measure (NQF #1789);

Hospital-level risk-standardized complication rate (RSCR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA) (NQF #1550);

Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization (NQF #0468);

Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization (NQF #1893);

Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) Surgery (NQF #2558);

Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization (NQF #0230);

Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following heart failure (HF) hospitalization (NQF #0229);

Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute ischemic stroke hospitalization.

Death Rate in Low Mortality Diagnosis Related Groups (PSI-02) (NQF #0347)

AHRQ's Mortality for Select Conditions (IQI-90) (NQF #0530)

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.

This claims-only hospital-wide mortality (HWM) measure is intended to complement the existing CMS Hospital-Wide All-Cause Risk-Standardized Readmission Measure (NQF #1789) to allow assessment of trends in hospital performance for both readmission and mortality outcomes, similar to other complementary pairs of readmission and mortality measures for specific conditions and

procedures. By measuring mortality outcomes across almost all hospitalized patients, this measure will provide an important additional performance assessment that will complement condition- and procedure-specific or other more narrowly defined mortality measures and allow a greater number of patients and hospitals to be evaluated. This HWM measure captures a similarly broad cohort to the CMS Hospital-Wide All-Cause Risk-Standardized Readmission Measure (NQF #1789), and a broader cohort than those of other CMS condition-specific measures. Because the mortality measure is focused on a different outcome, it differs from the existing CMS Hospital-Wide All-Cause Risk Standardized Readmission Measure (NQF #1789) in a couple of ways. First, this HWM measure includes patients with a principal discharge diagnosis of cancer (with some exceptions), whereas those patients are not included in the readmission measure. Cancer patients are appropriate to include in the HWM measure as many have survival as their primary goal; however due to cancer treatment plans, readmissions are frequently part of the plan and expected and therefore, are not a reasonable signal of quality. Another difference between the two measures is the number of divisions or specialty cohorts the patients are divided into, to more accurately risk adjust for case-mix and service-mix. The readmission measure divides patients into five categories, or “specialty cohorts”, while the mortality measure uses 15. This is because the risk of mortality is much more closely related to patient factors than readmission is related to patient factors. PSI-02 (NQF #0357) is another complementary mortality measure, which captures a different patient population and a different outcome compared with the HWM measure submitted with this application. PSI-02 captures patients 18 years of age or older, or obstetric patients, whereas the HWM measure captures patients between the ages of 65 and 94. PSI-02 captures DRGs with less than 0.5% mortality rate, whereas the HWM measure captures all patients within all CCSs, regardless of mortality rate. Hospital-wide mortality captures mortality up to 30 days past admission, where AHRQ PSI-02 only captures in-hospital mortality. IQI 90 (NQF #0530) is another complimentary mortality measure, which is a composite measure of the number of in-hospital deaths for a narrow range of conditions (CHF, stroke, hip fracture, pneumonia, acute myocardial infarction and GI hemorrhage). The HWM measure presented in this application captures all deaths after 30 days of admission, for all conditions and procedures.

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.)

There are no competing NQF-endorsed measures.

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 (CMS)

Co.2 Point of Contact: Lein, Han, lein.han@cms.hhs.gov, 410-786-0205-

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

Co.4 Point of Contact: Karen, Dorsey, karen.dorsey@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.

CORE convened a Technical Expert Panel comprised of clinicians, patients, and experts in quality improvement to provide input on key methodological decisions.

TEP Members:

- Michelle Beck – University of MD Upper Chesapeake Medical Center, MD
- Jeanne Black, PhD, MBA – Manager of Health Policy and Program Evaluation, Cedars-Sinai Health System; Los Angeles, CA
- John Bott – Manager of Healthcare Ratings, Consumer Reports; Yonkers, NY
- Roger Dmochowski, MD, MMHC, FACS – Executive Medical Director of Quality, Safety, and Risk, Vanderbilt University Medical Center; Nashville, TN
- Richard Dutton, MD, MBA – Chief Quality Officer, United States Anesthesia Partners; Houston, TX
- Gaye Hyre – Council Member and Patient/Family Caregiver Representative, CT State Innovation Model for Healthcare Equity and Access Council; Hartford, CT
- Irene Katzan, MD, MS – Director of Neurological Institute for Outcomes Research and Evaluation, Cleveland Clinic; Cleveland, OH
- Amy Kelley, MD, MSHA – Associate Professor and Staff Physician of Geriatrics and Palliative Medicine, Icahn School of Medicine at Mt Sinai; New York, NY
- Brenda Matti-Orozco, MD, FACP – Chief of Division of General Internal Medicine and Palliative Medicine and Hospice Medical Director, Morristown Medical Center and Atlantic Home Care & Hospice; Morristown, NJ
- Jyotirmay Sharma, MD, FACS – Associate Professor of Surgery and Medical Officer in Division of Healthcare Quality and Promotion, Emory University School of Medicine and Centers for Disease Control; Atlanta, GA

CORE convened two work groups comprised of patients and family caregivers, who represent important perspectives from diverse backgrounds, including a mix of genders, geographic locations, and experiences. They were essential in providing feedback around cohort development (particularly around whether to include hospice patients), and measure usability. We have withheld names to protect confidentiality.

Patient and Family Caregiver Work Group Members:

- Female, health advocate, and podcaster who has more than two decades of lived experience with complex chronic illness in New York.
- Male, heart transplant patient, intensive care unit advisory council for patient and families in Washington.
- Female, works with patients and families at a hospital in New Jersey.
- Female, educational psychologist, trained in a hospital, who has advocated for children with special needs in hospitals and schools in Texas.
- Male, is on a hospital advisory council for patients and families in New Jersey.
- Female, patient and family advisor for a medical group in New York.
- Female, is on the intensive care unit advisory council for patient and families in Washington.
- Female, current caregiver, and former patient and family advisor to a primary care medical group in New York.
- Female, council member for patients and families for a hospital in Washington.

CORE convened a Technical Work Group comprised of clinicians, surgeons, and statistical experts as well as experts in the development and challenges of a hospital-wide mortality measure.

Technical Work Group Members:

- Lee Fleisher, MD – Chair of Department of Anesthesiology and Critical Care, University of Pennsylvania Health System; Vice-Chair of the Consensus Standards Advisory Committee; Co-Chair of the Surgery Standing Committee of the National Quality Forum
- Leora Horwitz, MD, MHS – Associate Professor in the Departments of Population Health and Medicine at New York University School of Medicine; founding Director of the Center for Healthcare Innovation and Delivery Science; New York University Langone Medical Center, and of the Division of Healthcare Delivery Science, Department of Population Health, New York University School of Medicine
- David Shahian, MD - Professor of Surgery at Harvard Medical School; Vice President of the Massachusetts General Hospital (MGH) Center for Quality and Safety; and Associate Director of the MGH Codman Center for Clinical Effectiveness in Surgery; NQF Board and Executive Committee member; Chair of The Society of Thoracic Surgeons (STS) Council on Quality, Research, and Patient Safety and the STS Quality Measurement Task Force.

The CORE measure development team meets regularly and is comprised of experts in medicine, quality outcomes measurement,

and measure development.

CORE Measure Reevaluation Team:

- Doris Peter, PhD – Reevaluation Lead, CORE
- Amy Salerno, MD – Development Lead, CORE
- Karen Dorsey, MD – Reevaluation Division Director, CORE
- Lisa Suter, MD – New Measure Division Director, CORE
- Darinka Djordjevic, PhD – Project Manager, CORE
- Lynette Lines, MS, PMP – Previous Project Manager, CORE
- Shuling Liu, PhD – Lead Analyst, CORE
- Yongfei Wang, MS – Analyst, CORE
- Nicole Cormier, MPH – Additional Team Member, CORE
- Erica Norton, BS – Task Coordinator, CORE
- Fior Rodriguez, BS – Research Assistant, CORE
- Keith Loh, BS – Research Assistant, CORE
- Alex Ferrante, BS – Research Assistant, CORE
- Amanda Audette, BS – Research Assistant, CORE
- Rajvi Shah, Research, MPH Associate, CORE
- Julianne Ani, MPH – Research Associate, CORE
- Zhenqiu Lin, PhD – Statistical Consultant, Director of Data Management and Analytics, CORE
- Li Li, PhD – Supporting Analyst, CORE
- Xin Xin, MS - Supporting Analyst, CORE
- Jeph Herrin, PhD – Statistical Consultant, CORE
- Nihar Desai, MD, MPH – Clinical Consultant
- Jaqueline Grady, MS – Statistical Consultant and Associate Director of Data Management and Analytics
- Susannah Bernheim, MD, MHS – Director of Quality Measurement, CORE
- Harlan Krumholz, MD, MS – Senior Advisor and Director, CORE

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? [Annually](#)

Ad.5 When is the next scheduled review/update for this measure? [03, 2020](#)

Ad.6 Copyright statement:

Ad.7 Disclaimers:

Ad.8 Additional Information/Comments: