NATIONAL QUALITY FORUM

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 #: 0535
Corresponding Measures:
De.2. **Measure Title:** 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention (PCI) for patients without ST segment elevation myocardial infarction (STEMI) and without cardiogenic shock
Co.1.1. **Measure Steward:** American College of Cardiology
De.3. **Brief Description of Measure:** This measure estimates hospital risk-standardized 30-day all-cause mortality rate following percutaneous coronary intervention (PCI) among patients who are 18 years of age or older without STEMI and without cardiogenic shock at the time of procedure. The measure uses clinical data available in the National Cardiovascular Data Registry (NCDR) CathPCI Registry for risk adjustment. For the purpose of development and testing, the measure used a Medicare fee-for-service (FFS) population of patients 65 years of age or older with a PCI. For the purpose of maintenance, we tested the performance of the measure in a cohort of patients whose vital status was determined from the National Death Index. As such it reflects an all-payor sample as opposed to only the Medicare population. This is consistent with the measure's intent to be applicable to the full population of PCI patients.
1b.1. **Developer Rationale:** This measure will describe hospital-level mortality rates following PCI in patients without STEMI and without cardiogenic shock, with the overriding goal to reduce 30-day mortality rates to best-in-class. The expectation is that providing this information to hospitals, coupled with public reporting of hospitals' results, will drive internal hospital quality improvement efforts to focus efforts on reducing PCI mortality. Of note, the measure includes not only in-hospital deaths, but also deaths occurring after hospital discharge. This perspective may motivate hospitals to look for opportunities not only within the organization, but to better coordinate the transition of care from the inpatient to the outpatient arena.

S.4. **Numerator Statement:** The outcome for this measure is all–cause death within 30 days following a PCI procedure in patients without STEMI and without cardiogenic shock at the time of the procedure.
S.6. **Denominator Statement:** The target population for this measure includes inpatient and outpatient hospital stays with a PCI procedure for patients at least 18 years of age, without STEMI and without cardiogenic shock at the time of procedure.
S.8. **Denominator Exclusions:** Hospital stays are excluded from the cohort if they meet any of the following criteria:
(1) PCIs that follow a prior PCI in the same admission (either at the same hospital or a PCI performed at another hospital prior to transfer).
This exclusion is applied in order to avoid assigning the death to two separate admissions.
(2) For patients with inconsistent or unknown vital status or other unreliable data (e.g. date of death precedes date of PCI);
(3) Subsequent PCIs within 30-days. The 30-day outcome period for patients with more than one PCI may overlap. In order to avoid attributing the same death to more than one PCI (i.e. double counting a single patient death), additional PCI procedures within 30 days of the death are not counted as new index procedures.
(4) PCIs for patients with more than 10 days between date of admission and date of PCI. Patients who have a PCI after having been in the hospital for a prolonged period of time are rare and represent a distinct population that likely has risk factors related to the hospitalization that are not well quantified in the registry.

De.1. **Measure Type:** Outcome
S.17. **Data Source:** Claims, Other, Registry Data
S.20. **Level of Analysis:** Facility, Other

IF Endorsement Maintenance – Original Endorsement Date: Aug 05, 2009 **Most Recent Endorsement Date:** Oct 25, 2018

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?** This measure is most similar to and paired with NQF #0536 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention (PCI) for patients with ST segment elevation myocardial infarction (STEMI) or with cardiogenic shock. Its complementary value stems from the target population of without STEMI and without shock patients.

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
0535_NQF_evidence_attachment_Sep2017_2.26.18.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.
No

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.
This measure will describe hospital-level mortality rates following PCI in patients without STEMI and without cardiogenic shock, with the overriding goal to reduce 30-day mortality rates to best-in-class. The expectation is that providing this information to hospitals, coupled with public reporting of hospitals' results, will drive internal hospital quality improvement efforts to focus efforts on reducing PCI mortality. Of note, the measure includes not only in-hospital deaths, but also deaths occurring after hospital discharge. This perspective may motivate hospitals to look for opportunities not only within the organization, but to better coordinate the transition of care from the inpatient to the outpatient arena.

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.*
Please see 1b.2. answer in supplemental attachment entitled " 0535F_Main Submission Form Supplement_04.09.18".

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.**
Inpatient mortality is the indicator that has been most widely used to evaluate the quality of cardiac procedures and is arguably the most important adverse outcome measure. The ACC summarized the experience of the NCDR CathPCI Registry from 1998-2000 and found that in-hospital mortality occurred in 1,422 of 100,253 PCI procedures (1.4%) (Shaw, Anderson et al. 2002). Mortality was higher in patients with acute myocardial infarction (4.9%) or cardiogenic shock (27.2%). In the present era, mortality rates for PCI in large series from experienced operators varied across hospitals (Carrozza, Cutlip et al. 2008). Prior studies have demonstrated significant variability in in-hospital PCI mortality across age groups, gender, geographic regions, socioeconomic status, and by

hospital volume (Mukherjee, Wainess et al. 2005). Although 12 states already report PCI outcomes, to date there has not been a unified national effort to publicly report PCI mortality.

Citations

Carrozza J, Cutlip D, Levin T. (2008). Periprocedural complications of percutaneous coronary intervention. UpToDate. B. Rose. Waltham, MA.

Mukherjee D, Wainess RM, et al. (2005). "Variation in outcomes after percutaneous coronary intervention in the United States and predictors of periprocedural mortality." Cardiology 103(3): 143-7.

Shaw RE, Anderson HV, et al. (2002). "Development of a risk adjustment mortality model using the American College of Cardiology-National Cardiovascular Data Registry (ACC-NCDR) experience: 1998-2000." J Am Coll Cardiol 39(7): 1104-12.

Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, Hailpern SM, Ho M, Howard V, Kissela B, Kittner S, Lloyd-Jones D, McDermott M, Meigs J, Moy C, Nichol G, O'Donnell C, Roger V, Sorlie P, Steinberger J, Thom T, Wilson M, Hong Y. Heart Disease and Stroke Statistics_2008 Update: A Report From the American Heart Association Statistics Committee and Stroke Statistics Subcommittee and for the American Heart Association Statistics Committee and Stroke Statistics Subcommittee Circulation 2008;117;e25-e146; originally published online Dec 17, 2007; DOI: 10.1161/CIRCULATIONAHA.107.187998.

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.*

Please see response to 1b.4 in the supplemental attachment entitled "0535F_Main Submission Form Supplement_04.09.18".

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):*

Cardiovascular, Cardiovascular : Coronary Artery Disease (PCI)

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

Care Coordination, Safety, Safety : Complications

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

Elderly, Populations at Risk

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.)*

https://www.ncdr.com/WebNCDR/docs/public-data-collection-documents/cathpci_v4_codersdictionary_4-4.pdf?sfvrsn=2

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:** 0535F_PCI_Mortality_No_STEMI_3.15.18-637169506355236351.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.
No changes were made to the measure specification since the last endorsement

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 all–cause death within 30 days following a PCI procedure in patients without STEMI and without cardiogenic shock at the time of the procedure.

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).
Deaths can be identified using an external source of vital status, such as the Social Security Administration's Death Master File (DMF) or the Centers for Disease Control and Prevention's National Death Index (NDI). For the purpose of development and reassessment of the measure, we used a Medicare FFS population age 65 and over. We linked CathPCI registry with corresponding Medicare data and identified: a) in-hospital deaths using the discharge disposition indicator in the Standard Analytic File (SAF) and identified) post-discharge deaths using the Enrollment Database (EDB). For the purpose of maintenance, the measure used a cohort of patients whose vital status was determined from the National Death Index. This data sample reflects a more comprehensive data set including a broader age range (>18 years) and an all-payer model compared to the Medicare data set (>65 years) used for initial measure testing.

S.6. **Denominator Statement** *(Brief, narrative description of the target population being measured)*
The target population for this measure includes inpatient and outpatient hospital stays with a PCI procedure for patients at least 18 years of age, without STEMI and without cardiogenic shock at the time of procedure.

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).
The time window can be specified from one or more years. This measure was developed with Medicare claims and CathPCI Registry data from one calendar year.
The measure cohort is patients undergoing PCI who do NOT have STEMI and do NOT have cardiogenic shock. STEMI or cardiogenic shock is defined as present in Version 4.4 of the CathPCI registry as follows:
Admissions with PCI are identified by field 5305 (PCI=yes);
STEMI or shock is identified by:
(1) Symptoms present on admission = ACS:STEMI (field 5000 = 6) with Time Period Symptom Onset to Admission within 24 hours (field 5005 = 5006, 5007, 5008) or Acute PCI = Yes (field 7035);
OR
(2) Cardiogenic shock = Yes (field 5060=1)

S.8. **Denominator Exclusions** *(Brief narrative description of exclusions from the target population)*
Hospital stays are excluded from the cohort if they meet any of the following criteria:
(1) PCIs that follow a prior PCI in the same admission (either at the same hospital or a PCI performed at another hospital prior to transfer).
This exclusion is applied in order to avoid assigning the death to two separate admissions.
(2) For patients with inconsistent or unknown vital status or other unreliable data (e.g. date of death precedes date of PCI);
(3) Subsequent PCIs within 30-days. The 30-day outcome period for patients with more than one PCI may overlap. In order to avoid attributing the same death to more than one PCI (i.e. double counting a single patient death), additional PCI procedures within 30 days of the death are not counted as new index procedures.
(4) PCIs for patients with more than 10 days between date of admission and date of PCI. Patients who have a PCI after having been in the hospital for a prolonged period of time are rare and represent a distinct population that likely has risk factors related to the hospitalization that are not well quantified in the registry.

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.)*
Excluded hospital stays are identified as follows:
(1) PCIs that follow a prior PCI in the same admission or occur during a transfer-in admission (PCI to PCI). For the purposes of development we used Medicare data to define transfers as two admissions that occur within 1 day of each other and identified patients in this cohort who had a PCI during both admissions. This can also be identified in the registry data. (Note: For purposes of maintenance, we used CathPCI registry data to identify patients transferred in who had a prior PCI at the transferring hospital)
(2) Patients with inconsistent or unknown vital status or other unreliable data (e.g. date of death precedes date of PCI). The specific data fields will depend on the data source used.
(3) Not the first hospital stay with a PCI in the 30 days prior to a patient death. These stays are identified by procedure date in the CathPCI Registry and death date in the vital status data source.
(4) PCIs for patients with more than 10 days between date of admission and date of PCI. We determine length of stay by subtracting the admission date from the procedure date in the CathPCI Registry.

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.)*
Results of this measure will not be 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.)*
The measure score is calculated based on the following steps:
1. Patient cohort is identified based on the inclusion and exclusion criteria (see questions S.7, S.8, S.9, S.10, S.11);
2. Data elements for risk adjustment are collected using the first collected value, as detailed below;
3. Outcome is ascertained from an outside data source, such as the Medicare Enrollment Database (see questions S.4, S.5, S.6)
4. Measure score is calculated with aggregated data across all included sites, as described below.
Risk-adjustment variables
The measure is adjusted for the variables listed below:
1. Age (10 year increments)
2. Body Mass Index (5 kg/m^2 increments)
3. History of congestive heart failure
4. History of cerebrovascular disease
5. History of peripheral vascular disease
6. History of chronic lung disease
7. Diabetes
8. Glomerular Filtration Rate (GFR) (derived)
9. Previous PCI
10. Heart Failure - current status
11. New York Hospital Association
12. Symptom onset
13. Ejection Fraction percent (EF)
14. PCI status
15. Highest risk lesion – coronary artery segment category
16. Highest risk lesion: Society for Cardiovascular Angiography and Interventions (SCAI)

Measure Score Calculation
The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths, multiplied by the national unadjusted mortality rate. For each hospital, the predicted hospital outcome (the numerator) is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the "denominator" is the number of deaths expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality (better quality) and a higher ratio indicates higher-than-expected mortality (worse quality).
The predicted hospital outcome (the numerator) is calculated by regressing the risk factors and the hospital-specific intercept on the risk of mortality, multiplying the estimated regression coefficients by the patient characteristics in the hospital, transforming, then summing over all patients attributed to the hospital to get a value. The expected number of deaths (the denominator) is obtained by regressing the risk factors and a common intercept on the mortality outcome using all hospitals in our sample, multiplying the subsequent estimated regression coefficients by the patient characteristics observed in the hospital, transforming, and then summing over all patients in the hospital to get a value. To assess hospital performance in any reporting period, we re-estimate the model coefficients using the years of data in that period.
Please see attachments for more details on the calculation algorithm and the value sets for the risk-adjustment variables.
References:
Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226.

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 or survey. Data from all hospitals and all PCI procedures would be included in the process of re-estimating model variables. For public reporting, minimum sample size has not been determined.

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 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, Other, Registry Data

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:
NCDR CatchPCI Registry
Vital Status Source:
National Death Index, Death Masterfile, Medicare enrollment database, or equivalent

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)*
Available at measure-specific web page URL identified in S.1

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

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

2. Validity – See attached Measure Testing Submission Form
0535_NQF_testing_attachment_Sep2017_3.28.18F.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.
No

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.
No

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

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.**
Generated or collected by and used by healthcare personnel during the provision of care (e.g., blood pressure, lab value, diagnosis, depression score), Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry), Other
If other: The outcome will be determined from an administrative database such as the National Death Index.

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 health records (EHRs)

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).
ACC is in the process of developing a common data dictionary mapped to coded terminology standards with the intent of improving interoperability with EHRs and potentially creation of emeasures.

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.
Implementation of this measure requires matching of patient data to external data source to determine the outcome endpoint (Death 30 days after PCI). This has resulted in several implementation challenges

- Data Availability: ACC was not able to implement the measure using CMS data as we could not identify a mechanism to use CMS Data for purposes of public reporting. Accordingly we have had to modify implementation strategy, rework our models and match NCDR records to CDC National Death Index (NDI) data.
- Patient Confidentiality: CDC NDI requires direct patient identifiers in order to meet the minimum criteria for matching.

Roughly 15% of submitting NCDR sites (based on 2017Q2 CathPCI data) do not submit direct patient identifiers to the registry and are therefore ineligible for NDI matching and cannot participate in this measure.

- Data Cost: Use of the CDC NDI data as the source of vital status requires a substantial investment. For example, obtaining vital status on three years of PCI patients resulted in a cost of~$100,000.
- Data Timeliness: CDC NDI is released on a yearly basis, roughly one year after the calendar year of death along with processing time of the matching process and report generation and the most contemporary data available is over 18 months old.

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)*.

This measure was developed and designed to be used across other organizations and by other measure implementers. The fee and licensing information include below is specific to NCDR program requirements:

The ACCF's program the National Cardiovascular Data Registry (NCDR) provides evidence based solutions for cardiologists and other medical professionals committed to excellence in cardiovascular care. NCDR hospital participants receive confidential benchmark reports that include access to measure macro specifications and micro specifications, the eligible patient population, exclusions, and model variables (when applicable). In addition to hospital sites, NCDR Analytic and Reporting Services provides consenting hospitals' aggregated data reports to interested federal and state regulatory agencies, multi-system provider groups, third-party payers, and other organizations that have an identified quality improvement initiative that supports NCDR-participating facilities. Lastly, the ACCF also allows for licensing of the measure specifications outside of the Registry. For calendar year 2014 the annual pricing for hospitals, NCDR Analytic and Reporting Services, and licensing of measure specifications ranges from $2900-$50,000.
Measures that are aggregated by ACCF and submitted to NQF are intended for public reporting and therefore there is no charge for a standard export package. However, on a case by case basis, requests for modifications to the standard export package will be available for a separate charge.

There is no added procedural risk to patients through their hospital's involvement in the CathPCI Registry. No testing, time, risk, or procedures beyond those required for routine care will be imposed.

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 <u>and</u> 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	Quality Improvement (external benchmarking to organizations) National cardiovascular data Registry https://www.ncdr.com/webncdr/cathpci/home/datacollection

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

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

- Level of measurement and setting

N/A

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?*)
This measure is designed for use in public reporting, but it is currently not in use. See below for rationale and plan for public reporting. ACC plans to include this measure in NCDR's public reporting program in the future.

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.*)
Update to credible plan (11/8/17):
We moved forward with implementing the 30-day risk adjusted mortality measures in the CathPCI registry for the ´Quarter 3, 2017 30-Day mortality outcomes report´ which included data from 2011 to 2014. However, ACC held off on public reporting since we are also in the process of updating the CathPCI registry to version 5. The new registry version includes elements to assess out-of-hospital cardiac arrest, which has been identified in the literature as a risk factor that should be considered in mortality modeling(1,2). Additionally, when preparing the public reporting metric for in-hospital mortality (#0133) and 30-day mortality (#0536), we found that the measures were not harmonized in structure (i.e. the 30-day measure is a hierarchical model whereas the in-hospital measure is not). As such, these measures could not be rolled up together to create an appropriate composite view of mortality. We plan to modify the in-hospital mortality model to a hierarchical structure when we expand to take advantage of the additional elements in version 5 of CathPCI registry, particularly cardiac arrest, rather than sequencing a number of major revisions in a relatively short time period for hospitals. In order to avoid unintended negative consequences, ACC has made the decision to put a hold on public reporting until the cardiac arrest elements can be considered for modeling and the inpatient and 30-day PCI mortality models can be structurally harmonized. In addition, for purposes of public reporting this measure will also always be paired with (#0536) 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention (PCI) for patients with ST segment elevation myocardial infarction (STEMI) and with cardiogenic shock.

Additionally, ACC was in the process of transferring measure stewardship from CMS during the last re-endorsement in 2014. Therefore, ACC previously had limited control over the public use of the measure until it resumed primary stewardship of the measure less than 3 years ago

Citation:
[1] Peberdy, M.A., Donnino, M.W., Callaway, C.W., et al. Impact of Percutaneous Coronary Intervention Performance Reporting on Cardiac Resuscitation Centers: A Scientific Statement From the American Heart Association. Circulation. 2013;128:762-773; originally published online July 15, 2013; doi: 10.1161/CIR.0b013e3182a15cd2
[2] Camuglia, A.C., Randhawa, V.K., Lavi, S., et al. Cardiac catheterization is associated with superior outcomes for survivors of out of hospital cardiac arrest: Review and meta-analysis. Elsevier: Resuscitation 85 (2014) 1533–1540 . www.elsevier.com/locate/resuscitation

NCDR Public Reporting Background:
ACC's National Cardiovascular Data Registry (NCDR) Voluntary Hospital Public Reporting Program:
The ACC currently runs a program to give hospitals the opportunity to voluntarily publicly report their measure results based on data from the National Cardiovascular Data Registry (NCDR). Hospitals that choose to participate have their results displayed on ACC's CardioSmart. Currently Hospitals can report on five measures from the CathPCI Registry and five measures from the ICD Registry. Of these publicly reporting measures, five are NQF-endorsed:

- NQF # 1522: Use of a medicine in the ACEi or ARB class to improve heart function after ICD implant in patients with less than normal heart function.
- NQF # 1528: Use of a beta-blocker medication after ICD implant in patients with a previous heart attack.
- NQF #1529: Use of a beta-blocker medication after ICD implant in patients with less than normal heart function.
- NQF #0965: Use of all recommended medications (ACEI or ARB and beta-blocker) to improve heart function and blood pressure after ICD implant.

- NQF # 0964: Therapy with aspirin, P2Y12 inhibitor, and statin at discharge following PCI in eligible patients (composite measure)

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.
Performance results are distributed to all CathPCI registry participants as part of quarterly benchmark reports, which provide a detailed analysis of an institution´s individual performance in comparison to the entire registry population from participating hospitals across the nation. Reports include an executive summary dashboard, at-a-glance assessments, and patient level drill-downs. Registry participants also have access to an outcome report companion guide which provides common definitions and detailed metric specifications to assist with interpretation of performance rates.

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.**
The majority of the required data elements are routinely generated and acquired during the delivery of standard cardiac care to this patient population. Electronic extraction of data recorded as part of the procedure expedites data collection. This strategy offers point of care collection and minimizes time and cost. Institutions can manually report using a free web-based tool or automate the reporting by using certified software developed by third-party vendors. The data elements required for this measure are readily available within the patient's medical record or can be attained without undue burden within the hospital. Most data elements exist in a structured format within patient's electronic health record.
There are a number of methods used to educate and provide general support to registry participants. This includes the following:
- Registry Site Manager Calls are available for all NCDR participants. RSM calls are provided as a source of communication between NCDR and participants to provide a live chat Q and A session on a continuous basis.
- New User Calls are available for NCDR participants, and are intended for assisting new users with their questions.
- NCDR Annual Conference

The NCDR Annual Conference is a well-attended and energetic two-day program at which participants from across the country come together to hear about new NCDR and registry-specific updates. During informative general sessions, attendees can learn about topics such as transcatheter therapies, the NCDR dashboard, risk models, data quality and validation, and value-based purchasing. Attendees also receive registry updates and participate in advanced case studies covering such topics as Appropriate Use Criteria and outcomes report interpretation.
- Release notes (for outcomes reports)
- Clinical Support

The NCDR Product Support and Clinical Quality Consultant Teams are available to assist participating sites with questions Monday through Friday, 9:00 a.m. - 5:00 p.m. ET.

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.
Feedback is typically obtained through monthly registry site manager monthly calls, ad hoc phone calls tracked with salesforce software, and during registry –specific break-out sessions at the NCDR's annual meeting. Registry Steering Committee members may also provide feedback during regularly scheduled calls.

4a2.2.2. **Summarize the feedback obtained from those being measured.**
The 30-day mortality measure was implemented for the first time in the CathPCI registry in Quarter 3, 2017. Feedback that has been received since implementation is described below.
1)Insufficient linking data – sites who do not routinely submit Direct Patient Identifiers will not meet the minimum matching criteria for the National Death Index match. For these patient records, mortality cannot be reliably determined.
2) Measure users have asked when this measure will be updated.

There have been no major issues or other feedback received from registry participants with respect to collecting data for this metric.

4a2.2.3. **Summarize the feedback obtained from other users**
No other feedback was received from other users.

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 (Measure was not modified since last endorsement)

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.
The performance data used and described in 1b reflects a different cohort of data from when the measure was last endorsed. We previously analyzed CMS and CathPCI registry data from 2010 to 2011, however, for this endorsement period had access to the National Death Index (NDI) data from 2011-2014. NDI data is more comprehensive and allowed for the risk model to be applied to all-payers and a wider age range of patients (>18 years of age) compared to CMS data (>65 years of age). Based on the differences in cohorts of data analyzed (CMS vs NDI), we are unable to comment on or draw conclusions from risk adjusted performance trends over time. However, the unadjusted 30-day mortality rate remained low and increased slightly during the study period, from 1.00% in 2011-12 to 1.10% in 2012-2013 and to 1.12% in 2013-14.

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.**
Ensuring data quality is critical so that the RSMRs can provide fair and accurate estimates of outcomes across hospitals. However, all data sources are potentially prone to misclassifications. Accordingly, adequate mechanisms will need to be implemented to ensure data quality (such as monitoring data for variances in case mix [e.g., unexpectedly high proportion of salvage PCI or cardiogenic shock], chart audits, and possibly adjudicating cases that are vulnerable to systematic misclassification). The NCDR CathPCI registry has successfully implemented methods to ensure that quality data are used for the risk adjustment methodology.

Studies suggest that public reporting of the outcomes of cardiovascular procedures may have unintended consequences. Joynt and colleagues compared the characteristics and outcomes of patients undergoing PCI in states with (MA, NY, PA) and regional states without (CT, DE, ME, MD, NH, RI, VT) public reporting and found that the odds of receiving a PCI for NSTEMI patients in public reporting states versus non-reporting states were similar, whereas STEMI patients with acute MI were less likely to receive PCI in public reporting states than in non-public reporting states. There were no differences in overall 30-day mortality rates among acute MI NSTEMI or STEMI patients in reporting versus non-reporting states. Determining the underlying causes and appropriateness of these differences is impossible, but there is concern that physicians in states that publicly report PCI outcomes would either refer high risk cases to states without public reporting or avoid such cases altogether. Implementing a national measure of PCI outcomes would avoid the former problem in that public reporting would be consistent across states.

Nevertheless, this measure will continue to require close attention to the possibility that high risk patients are not receiving PCI when clinically indicated. The measure is, however, complementary to the previously approved measures for 30-day mortality of AMI and heart failure patients in that inappropriate avoidance of high risk PCI cases may have a detrimental effect on hospitals' performance on these other measures of cardiovascular outcomes. However, it is important to note that this measure has not undergone public reporting to date, thus the unintended consequences are speculative.

Measure implementation will require close attention to data quality. Potential solutions include a) detailed chart audits, b) close attention to variances in case mix and c) review of some or all cases coded as cardiogenic shock or a salvage PCI.

Joynt, K. E., Blumenthal, D. M., Orav, E. J., Resnic, F. S., & Jha, A. K. (2012). Association of Public Reporting for Percutaneous Coronary Intervention with Utilization and Outcomes among Medicare beneficiaries with Acute Myocardial Infarction. JAMA, 308(14), 1460–1468. http://doi.org/10.1001/jama.2012.12922

4b2.2. **Please explain any unexpected benefits from implementation of this measure.**
N/A - there were no unexpected benefits noted for this measure.

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)**
0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization
0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization
0536 : 30-day all-cause risk-standardized mortality rate following Percutaneous Coronary Intervention (PCI) for patients with ST segment elevation myocardial infarction (STEMI) or cardiogenic shock

5.1b. **If related or competing measures are not NQF endorsed please indicate measure title and steward.**
NQF # 0536 - 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention (PCI) for patients with ST segment elevation myocardial infarction (STEMI) or with cardiogenic shock
NQF # 0230 - Acute Myocardial Infarction 30-day Mortality
NQF # 0229 - Heart Failure 30-day Mortality

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.**
N/A

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.)
This measure is most similar to the 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention

(PCI) for patients with ST segment elevation myocardial infarction (STEMI) and with cardiogenic shock. Its additive value stems from the target population of without STEMI and without shock patients.

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.
Attachment **Attachment:** 0535F_Main_Submission_Form_Supplement_04.09.18F.pdf

Contact Information

Co.1 **Measure Steward (Intellectual Property Owner):** American College of Cardiology
Co.2 **Point of Contact:** Kim, Lavin, comment@acc.org, 202-375-6448-
Co.3 **Measure Developer if different from Measure Steward:** American College of Cardiology
Co.4 **Point of Contact:** Esteban, Perla, eperla@acc.org, 202-375-6499-

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 measure developer, Yale New Haven Health Servicec Corporation Center for Outcomes Research and Evaluation (YNHHSC/CORE) obtained expert and stakeholder input on the two measures through two mechanisms. First, the team has held regular conference calls with a Working Group of YNHHSC/CORE and American College of Cardiology (ACC)/National Cardiovascular Data Registry (NCDR) experts in cardiovascular registries and in the outcomes measure field. Second, YNHHSC/CORE sought and considered the input of an American College of Cardiology Foundation (ACCF) designated Task Force.
Working Group
Ralph Brindis, M.D., M.P.H., F.A.C.C.
Regional Senior Advisor for Cardiovascular Disease, Northern California Kaiser Permanente; Clinical Professor of Medicine, UCSF, Oakland, CA; Chief Medical Officer and Chairman, Management Board, National Cardiovascular Data Registry

Barbara Christensen, R.N., M.H.A.
Senior Director, Registry Services, American College of Cardiology

Jeptha Curtis, M.D.
Assistant Professor of Medicine, Department of Internal Medicine (Cardiovascular Disease), Yale University

Elizabeth Drye, M.D., S.M.
Research Project Director, Yale/Yale-New Haven Hospital Center for Outcomes Research and Evaluation

Susan Fitzgerald, R.N., M.B.A.
Associate Director, Registry Development, American College of Cardiology

Lori Geary, M.P.H.
Research Project Coordinator, Yale/Yale-New Haven Hospital Center for Outcomes Research and Evaluation

Amy Heller, Ph.D., M.P.H.
Associate Director, Quality Products, American College of Cardiology

Tony Hermann, R.N., M.B.A., C.P.H.Q.
Associate Director, CathPCI Registry, American College of Cardiology

Kathleen Hewitt, R.N., M.S.N., C.P.H.Q.
Associate Vice President, American College of Cardiology

Harlan Krumholz, M.D., M. Sc., F.A.C.C.
Director, Yale Center for Outcomes Research and Evaluation; Representative, NCDR analytic center; Ex-officio to Task Force

Kristi Mitchell, M.P.H.
Senior Director, Research, Development and Quality Products, American College of Cardiology

Eric Peterson, M.D., M.P.H., F.A.C.C.
Professor of Medicine, Duke University; Director, Cardiovascular Outcomes, Duke Clinical Research Institute, Chapel Hill, NC; Member, NCDR Science Oversight Committee/ Representative, NCDR Analytic Center

John Rumsfeld, M.D., Ph.D., F.A.C.C.
Associate Professor of Medicine, University of Colorado; Clinical Coordinator, VA Ischemic

Lara Slattery, M.H.S.
Associate Director, Research, Development, and Quality Products Department – Registries, Products, and Publishing Division, American College of Cardiology

John Spertus, M.D., M.P.H., F.A.C.C.
Director of Cardiovascular Education and Outcomes Research, Mid America Heart Institute, Kansas City, MO; Member, NCDR Science Oversight Committee/Representative, NCDR analytic center; Chair, American College of Cardiology Foundation Task Force on Public Reporting of Hospital-Level Outcomes Measures

Yongfei Wang, M.S.
Senior Research Analyst, Yale/Yale-New Haven Hospital Center for Outcomes Research and Evaluation
William Weintraub, M.D., F.A.C.C.
Chair, CathPCI Registry Steering Committee; Section Chief, Cardiology, Christiana Care Health Services, Inc., Newark DE
Al Woodward, Ph.D., M.B.A.
Director, Research Services, American College of Cardiology

Task Force
Five Task Force members also serve as members of the Working Group, including:

Ralph G. Brindis, M.D., M.P.H., F.A.C.C.

Harlan Krumholz, M.D., M. Sc., F.A.C.C.

Eric Peterson, M.D., M.P.H., F.A.C.C.

John Rumsfeld, M.D., Ph.D., F.A.C.C.

John Spertus, M.D., M.P.H., F.A.C.C.

Other Task Force members are:
John Brush, M.D., F.A.C.C.
Cardiology Consultants LLC, Norfolk, VA; Chair, Quality Strategic Directions Committee

Vincent J. Bufalino, M.D., F.A.C.C.
Midwest Heart Specialists, Naperville, IL; Co-Chair, ACC Advocacy Committee

Gregory Dehmer, M.D., F.A.C.C.
Professor of Medicine, Texas A&M College of Medicine, Temple, TX;

Representative, The Society for Cardiovascular Angiography and Interventions

James Dove, M.D., F.A.C.C.
President, American College of Cardiology
President Emeritus, Prairie Cardiovascular Consultants, Ltd., Springfield, IL; President, ACC/ACCF Board of Trustees

Stephen C. Hammill, M.D., F.H.R.S.
Professor of Medicine, Mayo Clinic College of Medicine, Rochester, MN; Representative, Heart Rhythm Society

Frank E Harrell Jr., PhD
Professor of Biostatistics; Department Chair, Vanderbilt University School of Medicine- Department of Biostatistics, Nashville, TN

Barry K. Lewis, D.O., F.A.C.C.
Consultants in Cardiology, P.C., Farmington Hills, MI; Member, Advocacy Committee

William R. Lewis, M.D., F.A.C.C.
Metro Health Medical Center, Cleveland, OH; ACC Ohio Chapter Governor/ACC Board of Governors

Fred Masoudi, M.D., M.S.P.H., F.A.C.C.
Denver Health Medical Center, Denver, CO; Chair, ACC/AHA Task Force on Performance Measures

Andrea M. Russo, M.D. F.A.C.C.
University of Pennsylvania Health System, Philadelphia, PA; Representative, Heart Rhythm Society

Bonnie H. Weiner, M.D., F.S.C.A.I., F.A.C.C.
Professor of Medicine; Interim Chair Cardiovascular Medicine, St. Vincent Hospital at Worcester Medical Center, Worchester, MA; Representative, The Society for Cardiovascular Angiography and Interventions

Stuart Winston, D.O., F.A.C.C.
Michigan Heart, P. C., Ann Arbor, MI; ACC Michigan Chapter Governor/ACC Board of Governors

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.2 **Year the measure was first released:** 2009
Ad.3 **Month and Year of most recent revision:** 12, 2012
Ad.4 **What is your frequency for review/update of this measure?** With dataset revisions and based on new evidence.
Ad.5 **When is the next scheduled review/update for this measure?** 04, 2018

Ad.6 **Copyright statement:** N/A
Ad.7 **Disclaimers:** N/A

Ad.8 **Additional Information/Comments:** Please note that the next scheduled review/update for this measure will occur at the same time as the new version release date of the registry in 2018.