



March 8, 2018

**To:** NQF Members and the Public

**From:** NQF Staff

**Re:** Commenting Draft Report: National Voluntary Consensus Standards for Cardiovascular

## Background

This report reflects the review of measures in the Cardiovascular project. Cardiovascular disease (CVD) is the leading cause of death for men and women in the United States. It kills nearly one in four Americans and costs \$312 billion per year, more than 10 percent of annual health expenditures. Considering the toll of cardiovascular disease, measures that assess the performance of clinical care and patient outcomes are critical to reducing the negative impacts of CVD.

The 25-person Cardiovascular Standing Committee reviewed five measures; four were recommended for endorsement, and the Committee did not reach consensus for one of the measures.

## Recommended:

- 0133 In-Hospital Risk Adjusted Rate of Mortality for Patients Undergoing PCI (American College of Cardiology (American College of Cardiology)
- 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 (American College of Cardiology)
- 0642 Cardiac Rehabilitation Patient Referral From an Inpatient Setting (American College of Cardiology)
- 0643 Cardiac Rehabilitation Patient Referral From an Outpatient Setting (American College of Cardiology)

## Consensus Not Reached:

- 3309 Risk-Standardized Survival Rate (RSSR) for In-Hospital Cardiac Arrest (American Heart Association)

**The Committee requests comments on all measures, but especially for the measures where consensus was not reached.**

## NQF Member and Public Commenting

NQF Members and the public are encouraged to provide comments via the online commenting tool on the draft report as a whole, or on the specific measures evaluated by the Cardiovascular Standing Committee.

**Please note that commenting concludes on April 6, 2018 at 6:00 pm ET—no exceptions.**

# NQF-Endorsed Measures For Cardiovascular Conditions, Fall 2017

DRAFT REPORT FOR COMMENT

March 8, 2018



NATIONAL  
QUALITY FORUM

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# NQF-Endorsed Measures For Cardiovascular Conditions, Fall 2017

DRAFT REPORT FOR COMMENT

## Executive Summary

Cardiovascular disease (CVD) is the leading cause of death for men and women in the United States. It kills nearly one in four Americans and costs \$312 billion per year, more than 10 percent of annual health expenditures.<sup>1</sup> Considering the toll of cardiovascular disease, measures that assess clinical care performance and patient outcomes are critical to reducing the negative impacts of CVD.

NQF's cardiovascular portfolio of measures is one of the largest, and it includes primary prevention and screening, coronary artery disease (CAD), ischemic vascular disease (IVD), acute myocardial infarction (AMI), cardiac catheterization, percutaneous catheterization intervention (PCI), heart failure (HF), rhythm disorders, implantable cardioverter-defibrillators (ICDs), cardiac imaging, cardiac rehabilitation, and high blood pressure measures. Despite the large number of endorsed measures, gaps remain in patient-reported outcomes and patient-centric composite measures.

In the fall 2017 cycle of this project, the Cardiovascular Standing Committee evaluated five measures against NQF's standard evaluation criteria: one newly submitted measure and four measures undergoing maintenance review. The Standing Committee recommended the following four measures for endorsement:

- 0133 In-Hospital Risk Adjusted Rate of Mortality for Patients Undergoing PCI
- 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
- 0642 Cardiac Rehabilitation Patient Referral From an Inpatient Setting
- 0643 Cardiac Rehabilitation Patient Referral From an Outpatient Setting

The Committee did not reach consensus on one measure:

- 3309 Risk-Standardized Survival Rate (RSSR) for In-Hospital Cardiac Arrest

The body of this report includes brief summaries of the measures currently under review; [Appendix A](#) provides detailed summaries of the Committee's discussion and ratings of the criteria for each measure.

## Introduction

Cardiovascular disease (CVD) is the leading cause of death for men and women in the United States. It kills nearly one in four Americans and costs \$312 billion per year, more than 10 percent of annual health expenditures.<sup>1</sup> Considering the toll of cardiovascular disease, measures that assess the performance of clinical care and patient outcomes are critical to reducing the negative impacts of CVD.

The measures in the cardiovascular portfolio have been grouped into various conditions, diseases, or procedures related to cardiovascular health topic areas. These topic areas include primary prevention and screening, coronary artery disease (CAD), ischemic vascular disease (IVD), acute myocardial infarction (AMI), cardiac catheterization, percutaneous catheterization intervention (PCI), heart failure (HF), rhythm disorders, implantable cardioverter-defibrillators (ICDs), cardiac imaging, cardiac rehabilitation, and high blood pressure. The fall 2017 cycle of this project will address topic areas including:

- Acute Myocardial Infarction (AMI)
- Cardiac Surgery
- Cardiac Rehabilitation
- Coronary Artery Disease
- Percutaneous Coronary Intervention (PCI)
- In-Hospital Cardiac Arrest

## NQF Portfolio of Performance Measures for Cardiovascular Conditions

The Cardiovascular Standing Committee ([Appendix C](#)) oversees NQF's portfolio of cardiovascular measures. The portfolio includes measures for primary prevention ("specific practices for the prevention of disease or mental disorders in susceptible individuals or populations"); screening ("organized periodic procedures performed on large groups of people for the purpose of detecting disease"); and secondary prevention ("the prevention of recurrences or exacerbations of a disease or complications of its therapy"). It also contains measures for the evaluation, ongoing management, acute care, hospitalization, and cost and resource use in cardiovascular diseases and conditions. This portfolio contains 50 measures: 26 process measures, 15 outcome measures, 5 composite measures, and 4 efficiency measures (see table 1).

**Table 1. NQF Cardiovascular Portfolio of Measures**

|   | Process/Structure | Outcome | Composite | Efficiency |
|---|-------------------|---------|-----------|------------|
| <b>Primary prevention and screening</b> | 0                 | 0       | 0         | 0          |
| <b>CAD/IVD</b>                          | 7                 | 1       | 1         | 0          |
| <b>AMI</b>                              | 5                 | 4       | 1         | 0          |
| <b>Cardiac catheterization/PCI</b>      | 0                 | 6       | 1         | 1          |
| <b>Heart failure</b>                    | 10                | 2       | 0         | 0          |
| <b>Rhythm disorders</b>                 | 1                 | 1       | 0         | 0          |
| <b>ICDs</b>                             | 1                 | 0       | 2         | 0          |

|                     | Process/Structure | Outcome | Composite | Efficiency |
|---------------------|-------------------|---------|-----------|------------|
| Cardiac imaging     | 0                 | 0       | 0         | 3          |
| Cardiac Rehab       | 0                 | 0       | 0         | 0          |
| High blood pressure | 2                 | 1       | 0         | 0          |
| <b>Total</b>        | 26                | 15      | 5         | 4          |

Additional measures related to Cardiovascular are assigned to other projects. These include readmission measures for AMI and HF (readmissions project), measures for coronary artery bypass graft (CABG) (surgery project), and primary prevention measures (prevention and population health project).

## Cardiovascular Measure Evaluation

On January 29-31, 2018, the Cardiovascular Standing Committee evaluated one new measure and four measures undergoing maintenance review against [NQF's standard evaluation criteria](#).

**Table 2. Cardiovascular Measure Evaluation Summary**

|   | Maintenance  | New  | Total |
|---|--|--|-------|
| Measures under consideration                | 4  | 1  | 5     |
| Measures recommended for endorsement        | 4  | 0  | 4     |
| Measures where consensus is not yet reached | 0  | 1  | 1     |
| Reasons for not recommending                | Importance – 0<br>Scientific Acceptability – 0<br>Overall – 0<br>Competing Measure – 0 | Importance – 0<br>Scientific Acceptability – 0<br>Overall – 0<br>Competing Measure – 0 |       |

## Comments Received Prior to Committee Evaluation

NQF solicits comments on endorsed measures on an ongoing basis through the [Quality Positioning System \(QPS\)](#). In addition, NQF solicits comments prior to the evaluation of the measures via an online tool located on the project webpage. For this evaluation cycle, the commenting period opened on December 5, 2017 and will close on April 6, 2018. As of January 18, 2018, no comments were submitted or shared with the Committee prior to the measure evaluation meetings.

## Summary of Measure Evaluation

The following brief summaries of the measure evaluation highlight the major issues that the Committee considered. Details of the Committee's discussion and ratings of the criteria for each measure are included in [Appendix A](#).

## *Percutaneous Coronary Intervention (PCI)*

### **0133 In-Hospital Risk Adjusted Rate of Mortality for Patients Undergoing PCI (American College of Cardiology): Recommended**

**Description:** Risk adjusted rate of mortality for all patients age 18 and over undergoing PCI.; **Measure Type:** Outcome; **Level of Analysis:** Facility; **Setting of Care:** Inpatient/Hospital; **Data Source:** Registry Data

This outcome measure has been endorsed since 2007 and is publicly reported in the Blue Distinction Centers for Cardiac Care program as well as the Hospital Insight Program for Anthem. The Standing Committee expressed the importance of this measure to benchmarking facilities for quality initiatives. Data presented by the developer demonstrated a variation in performance from 0.96% to 3.0% in 2015, and a similar variation, 0.92% to 2.96% in 2016. The Committee provided some recommendations to refine the measure, such as excluding out-of-hospital cardiac arrests in the future to mitigate risk-averse behavior (e.g., “cherry picking” patients) until there is better risk adjustment to account for out-of-hospital cardiac arrests, and providing physician-level data to further increase transparency. Overall, the Committee agreed that this measure is methodologically sound and that the developer provided data demonstrating room for improvement among facilities.

### **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 (American College of Cardiology): Recommended**

**Description:** 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 with STEMI or 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 cohort was derived in a Medicare fee-for-service (FFS) population of patients 65 years of age or older with a PCI. For the purpose of maintenance, the measure used a cohort of patients whose vital status was determined from the National Death Index (which 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. **Measure Type:** Outcome; **Level of Analysis:** Facility, Other; **Setting of Care:** Inpatient/Hospital; **Data Source:** Claims, Other, Registry Data

This outcome measure, originally endorsed in 2009, and most recently in 2014, 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 with STEMI or cardiogenic shock at the time of procedure. The Committee agreed that the importance of the outcome is self-evident and accepted the prior evaluation without further discussion. Committee members expressed concerns about the performance data provided, however. They ultimately agreed that there is a significant performance gap and opportunity for improvement. Since the developer did not update the reliability and validity testing since the last review for this maintenance measure, the Committee accepted the prior evaluation without further discussion. The developer mentioned several implementation challenges; however, the Committee agreed that the measure is feasible and usable. While the measure is not currently used in a public

reporting program, the Committee determined that the developer was putting its best effort forward to achieve this goal and passed the measure on use. The Committee supported the measure and recommended it for continued endorsement.

### *Cardiac Rehabilitation*

#### **0642 Cardiac Rehabilitation Patient Referral From an Inpatient Setting (American College of Cardiology): Recommended**

**Description:** Percentage of patients admitted to a hospital with a primary diagnosis of an acute myocardial infarction or chronic stable angina or who during hospitalization have undergone coronary artery bypass (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery (CVS), or cardiac transplantation who are referred to an early outpatient cardiac rehabilitation/secondary prevention program. **Measure Type:** Process; **Level of Analysis:** Facility, Clinician: Group/Practice, Clinician: Individual; **Setting of Care:** Inpatient/Hospital; **Data Source:** Electronic Health Records, Paper Medical Records, Registry Data

This process measure originally endorsed in 2010, and most recently in 2014 captures patients who are admitted to a hospital for several cardiac conditions or procedures who are referred to a cardiac rehabilitation program prior to discharge from the hospital. The Committee was supportive of this measure, noting that the additional evidence provided by the developer further supports the measure. The Committee agreed that although performance rates have steadily increased over the years, the data demonstrate decreased participation in cardiac rehabilitation programs by patients with economic disadvantages, specifically women and older patients. Overall, the Committee determined that the measure meets NQF criteria for continued endorsement.

#### **0643 Cardiac Rehabilitation Patient Referral From an Outpatient Setting (American College of Cardiology): Recommended**

**Description:** Percentage of patients evaluated in an outpatient setting who in the previous 12 months have experienced an acute myocardial infarction or chronic stable angina or who have undergone coronary artery bypass (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery (CVS), or cardiac transplantation, who have not already participated in an early outpatient cardiac rehabilitation/secondary prevention program for the qualifying event, and who are referred to an outpatient cardiac rehabilitation/secondary prevention program. **Measure Type:** Process; **Level of Analysis:** Clinician: Group/Practice, Clinician: Individual, Integrated Delivery System; **Setting of Care:** Outpatient Services; **Data Source:** Electronic Health Records, Registry Data, Paper Medical Records

This process measure, originally endorsed in 2010 and most recently endorsed in 2014, captures referrals for cardiac rehabilitation given to patients during outpatient visits for several cardiac conditions or procedures. The Committee expressed its support for this measure and agreed that it meets NQF criteria for continued endorsement.



## *In-Hospital Cardiac Arrest*

### **3309 Risk-Standardized Survival Rate (RSSR) for In-Hospital Cardiac Arrest (American Heart Association): Consensus Not Reached**

**Description:** This measure estimates a hospital -level risk standardized survival rate (RSSR) for patients aged 18 years and older who experience an in-hospital cardiac arrest.; **Measure Type:** Outcome; **Level of Analysis:** Facility; **Setting of Care:** Emergency Department and Services, Inpatient/Hospital; **Data Source:** Registry Data

This measure is a new outcome measure under consideration for endorsement and is being used in the American Heart Association (AHA) Get With The Guidelines (GWTG)-Resuscitation Professional Certification or Recognition Program. The measure estimates a hospital-level risk standardized survival rate (RSSR) for patients aged 18 years and older who experience an in-hospital cardiac arrest. The developer outlined several care processes that can be undertaken by the provider to influence patient survival at discharge using the GWTG-Resuscitation Registry data. Despite limitations indicated by the data, the Committee agreed that the evidence supported the measure, the existence of a significant performance gap, and feasibility and usability of the measure. However, the Committee had several concerns about the measure specifications and the discrepancies found in the testing data provided by the developer. Ultimately, the Committee was not able to reach consensus on the reliability of the measure. The developer will provide a testing attachment with the corrected testing data during the comment period. Commenters are encouraged to provide feedback to the Committee during the public and NQF member comment period.

## **Reference**

<sup>1</sup> Agency for Healthcare Research and Quality (AHRQ). *2015 National Healthcare Quality and Disparities Report and 5th Anniversary Update on the National Quality Strategy*. Rockville, MD: AHRQ; 2016. Available at <http://www.ahrq.gov/research/findings/nhqdr/nhqdr15/index.html>. Last accessed March 2018.

## Appendix A: Details of Measure Evaluation

**Rating Scale:** H=High; M=Moderate; L=Low; I=Insufficient; NA=Not Applicable; Y=Yes; N=No

### Measures Recommended

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#### 0133 In-Hospital Risk Adjusted Rate of Mortality for Patients Undergoing PCI

[Submission](#) | [Specifications](#)

**Description:** Risk adjusted rate of mortality for all patients age 18 and over undergoing PCI.

**Numerator Statement:** Patients 18 years of age and older with a PCI procedure performed during episode of care who expired

**Denominator Statement:** Patients 18 years of age and older with a PCI procedure performed during episode of care.

**Exclusions:** 1. NCDR Registry patients who did not have a PCI (Patient admissions with a diagnostic cath only during that admission);

2. Patient admissions with PCI who transferred to another facility on discharge

**Adjustment/Stratification:** Other. We have used hierarchical logistic regression to calculate the risks for peri-procedural mortality and use these data to create risk-standardized event rates.

**Level of Analysis:** Facility

**Setting of Care:** Inpatient/Hospital

**Type of Measure:** Outcome

**Data Source:** Registry Data

**Measure Steward:** American College of Cardiology

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#### STANDING COMMITTEE MEETING 01/29/2018

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

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

1a. Evidence: **Accepted prior evaluation**; 1b. Performance Gap: **H-8; M-9; L-0; I-0**

Rationale:

- The developer provided information on how the use of guidelines, appropriate use criteria, and risk models can lead to a decrease in mortality associated with percutaneous coronary intervention (PCI).
- The Committee expressed the continued importance of this measure to benchmark facilities for quality initiatives and accepted the prior evaluation of evidence without further discussion.
- Data presented by the developer from over 1,500 hospitals and around 700,000 patients demonstrated a variation in performance from 0.96% to 3.0% in 2015, and a similar variation (0.92% to 2.96%) in 2016. The Committee concluded that there is still a performance gap and opportunity for improvement.

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

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity; 2c. For composite measures: Empirical Analysis Supporting Composite))

2a. Reliability: **Accepted prior evaluation**; 2b. Validity: **H-1; M-15; L-0; I-0**

### Rationale:

- The developer performed data element and measure score reliability testing with a test-retest and signal to noise analysis. There was no clear misclassification by test-retest reliability for any assessable risk factor greater than 3.5% across all centers, and the average score of the signal to noise analysis was 0.7. The Committee agreed to accept the prior evaluation of the reliability criteria.
- Empirical validity testing of the measure score was assessed by comparing the performance of the risk-adjusted model in the development sample and two validation samples. The developer assessed discrimination in the model with the c-statistic. The developer noted the c-statistic is 0.93, which means that the probability that predicting the outcome is substantially better than chance.
- The Committee questioned if the risk-adjustment model accounted for lower performing institutions possibly having higher risk patients.
- The Committee suggested the developer exclude out-of-hospital cardiac arrests in the future to mitigate risk-averse behavior (e.g., “cherry picking” patients) until there is better risk-adjustment to account for out-of-hospital cardiac arrests. The Committee concluded the measure continues to meet the validity criterion.

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## **3. Feasibility: H-13; M-3; L-0; I-0**

(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/unintended consequences identified 3d. Data collection strategy can be implemented)

### Rationale:

- The Committee agreed this measure is highly feasible due to being in use for 10 years.

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## **4. Use and Usability: The measure meets the Use sub-criterion**

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

4a. Use: **Pass-16; No Pass-0**; 4b. Usability: **H-0; M-15; L-0; I-1**

### Rationale:

- This measure is currently used in two public reporting programs (Blue Distinction Centers for Cardiac Care and Quality Hospital Insight program for Anthem).
- Because the National Cardiovascular Data Registry (NCDR) CathPCI Registry has been implemented in numerous hospitals for many years and is reproducible, the Committee agreed that this measure is still useful.
- Committee members discussed the potential unintended consequence of facilities or physicians avoiding intervention on very sick patients who could benefit from a PCI.
- The Committee encouraged the developer to provide physician-level data to further increase transparency on the data collected. The developer responded that this is a facility-level measure

not a physician-level measure and data on individual physician performance might be challenging to obtain.

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## 5. Related and Competing Measures

This measure is related to:

- 0119 : Risk-Adjusted Operative Mortality for CABG
- 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization for patients 18 and older
- 2411: Comprehensive Documentation for Indications for PCI
- 2459 In-hospital Risk Adjusted Rate of Bleeding Events for Patients Undergoing PCI
- 0535: 30-day All-Cause Risk-Standardized Mortality Rate Following PCI for Patients Without STEMI and Without Cardiogenic Shock
- 0536: 30-Day All-Cause Risk-Standardized Mortality Rate Following PCI for Patients with STEMI or Cardiogenic Shock

The Committee was not able to discuss these measures during the January 29 web meeting and will have an opportunity to discuss the measures on the post-comment call on April 19, 2018.

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

## 6. Public and Member Comment

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

## 8. Appeals

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### 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

[Submission](#) | [Specifications](#)

**Description:** 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 with STEMI or 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 cohort was derived in a Medicare fee-for-service (FFS) population of patients 65 years of age or older with a PCI. For the purpose of maintenance, the measure used a cohort of patients whose vital status was determined from the National Death Index (which 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.

**Numerator Statement:** The outcome for this measure is all-cause death within 30 days following a PCI procedure in patients with STEMI or cardiogenic shock at the time of the procedure.

**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, with STEMI or cardiogenic shock at the time of procedure, including outpatient and observation stay patients who have undergone PCI but have not been admitted. It is unlikely that patients in this cohort would not be admitted to the hospital, but we keep this criterion to be consistent with the complementary non-STEMI, non-cardiogenic shock PCI cohort.

**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.

**Adjustment/Stratification:** Statistical risk model

**Level of Analysis:** Facility, Other

**Setting of Care:** Inpatient/Hospital

**Type of Measure:** Outcome

**Data Source:** Claims, Other, Registry Data

**Measure Steward:** American College of Cardiology

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## STANDING COMMITTEE MEETING 01/29/2018

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

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

1a. Evidence: **Accepted prior evaluation**; 1b. Performance Gap: **H-10; M-8; L-0; I-0**

#### Rationale:

- The developer referenced literature supporting an association with improved survival and the use of preprocedural clopidogrel and glycoprotein 2b/3a inhibitors; the volume of iodinated contrast; and participation in continuous quality improvement programs. Additionally, the developer provided performance data from 1,276 hospitals and 94,907 admissions from 2011-2014 demonstrating a variation in risk-standardized mortality rates with a range from 4.7% to 15.7%.
- The Committee agreed that the importance of the outcome is self-evident and accepted the prior evaluation without further discussion.
- The developer provided data on the combined risk-standardized mortality rates for all payers and all ages (>18 years) from 1,356 hospitals and 245,877 admissions using NCDR CathPCI data

linked with National Death Index (NDI) from 2011-2014. The mean mortality was 8.3% with a range of 4.7 to 15.7%.

- One Committee member asked why the developer was providing data from 2011-2014 in 2018. The developer responded that there is a delay in receiving data from the NDI. Another Committee member expressed concern that the gap appears to be increasing. The developer explained the numbers appear to be increasing due to the addition of previously excluded, often vulnerable, populations. Overall, the Committee agreed that there is a significant performance gap and opportunity for improvement.

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

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity; 2c. For composite measures: Empirical Analysis Supporting Composite))

2a. Reliability: **Accepted prior evaluation**; 2b. Validity: **Accepted prior evaluation**

Rationale:

- The developer provided reliability testing at the data element and performance measure score level. A test-retest approach was performed with an intra-class correlation coefficient (ICC) of 0.122.
- The developer provided validity testing conducted at the data element level with an overall agreement of 92.0%. The validation sample scored 0.83 for the c-statistic.
- The Committee accepted the prior reliability and validity evaluation without further discussion because there was no updated testing since the last submission.

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## **3. Feasibility: H-5; M-12; L-0; I-0**

(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/unintended consequences identified 3d. Data collection strategy can be implemented)

Rationale:

- The developer stated all measure elements are readily available in electronic sources via administrative claims data, and coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims).
- The developer mentioned several implementation challenges including data availability, patient confidentiality, data cost, and data timeliness; however, the Committee ultimately agreed the measure is feasible despite these implementation challenges.

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## **4. Use and Usability: The measure meets the Use sub-criterion**

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

4a. Use: **Pass-17; No Pass-0**; 4b. Usability: **H-0; M-11; L-1; I-6**

Rationale:

- The measure is not currently publicly reported. The Committee noted that the Use criterion states that performance results should be used in at least one accountability application within three years of initial endorsement and publicly reported within six years of initial endorsement.

While the measure does not meet this requirement, the Committee determined that the developer was putting their best effort forward to achieve this goal and passed the measure on use.

- The Committee expressed concern that it was not possible to determine if progress toward achieving the goal of high quality, efficient healthcare for individuals or populations is occurring. Additionally, the developer has experienced several implementation challenges and there is a risk of harm to the patient if this measure is publicly reported. However, the Committee agreed that the measure was usable despite these issues.

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## 5. Related and Competing Measures

This measure is related to:

- 0229 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following heart failure (HF) hospitalization for patients 18 and older
- 0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization for patients 18 and older
- 0535 : 30-day all-cause risk-standardized mortality rate following percutaneous coronary intervention (PCI) for patients without ST segment elevation myocardial infarction (STEMI) and without cardiogenic shock

The Committee was not able to discuss these measures during the January 29 web meeting and will have an opportunity to discuss the measures on the post-comment call on April 19, 2018.

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

## 6. Public and Member Comment

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

## 8. Appeals

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## 0642 Cardiac Rehabilitation Patient Referral From an Inpatient Setting

[Submission](#) | [Specifications](#)

**Description:** Percentage of patients admitted to a hospital with a primary diagnosis of an acute myocardial infarction or chronic stable angina or who during hospitalization have undergone coronary artery bypass (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery (CVS), or cardiac transplantation who are referred to an early outpatient cardiac rehabilitation/secondary prevention program.

**Numerator Statement:** Number of eligible patients with a qualifying event/diagnosis who have been referred to an outpatient Cardiac Rehabilitation/Secondary Prevention (CR/SP) program prior to hospital discharge or have a documented medical or system reason why such a referral was not made.

(Note: The program may include a traditional CR/SP program based on face-to-face interactions and training sessions or may include other options such as home-based approaches. If alternative CR/SP

approaches are used, they should be designed to meet appropriate safety standards and deliver effective, evidence-based services.)

**Denominator Statement:** Number of hospitalized patients in the reporting period hospitalized with a qualifying cardiovascular disease event/diagnosis who do not meet any of the criteria listed in the denominator exclusion section below.

**Exclusions:** Exceptions criteria require documentation of one or more of the following factors that may prohibit cardiac rehabilitation participation:

-Medical factors (e.g., patient deemed by provider to have a medically unstable, life-threatening condition).

-Health care system factors (e.g., no cardiac rehabilitation/secondary prevention (CR/SP) program available within 60 min of travel time from the patient's home).

The only exclusion criterion for this measure is noted below:

-Patients who expired before discharge.

**Adjustment/Stratification:** No risk adjustment or risk stratification

**Level of Analysis:** Facility, Clinician : Group/Practice, Clinician : Individual

**Setting of Care:** Inpatient/Hospital

**Type of Measure:** Process

**Data Source:** Electronic Health Records, Paper Medical Records, Registry Data

**Measure Steward:** American College of Cardiology

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## STANDING COMMITTEE MEETING 01/30/2018

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

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

1a. Evidence: **Accepted prior evaluation**; 1b. Performance Gap: **H-1; M-16; L-0; I-0**;

#### Rationale:

- The developer cited systematic reviews of six ACCF/AHA guidelines with grading of the evidence for referral to cardiac rehabilitation for different heart disease/conditions. The quality, quantity, and consistency (QQC) is not provided for each of the six guidelines, but evidence grades are defined.
- The developer stated that two new studies were added to support the evidence.
- The Committee noted that the additional evidence provided by the developer has strengthened the importance of this measure. The Committee accepted the prior evaluation without further discussion.
- The developer provided new 2015-2016 performance rates from two registries. The ACTION registry demonstrated a percentage range from 77.0-79.0% and the CathPCI registry demonstrated a percentage range from 61.0-63.0%. The developer also provided 2012 disparities data from these two registries by gender, race, insurance, hospital teaching status, and hospital community.
- The Committee agreed there is an opportunity for improvement in care related to cardiac rehabilitation referral for hospitalized patients after certain cardiac events.



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

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity; 2c. For composite measures: Empirical Analysis Supporting Composite))

2a. Reliability: **Accepted prior evaluation**; 2b. Validity: **Accepted prior evaluation**

### Rationale:

- For reliability, empirical testing was conducted with three samples: seven hospitals using either paper or EHR records, the ACC/AHA ACTION-GWTG Registry, and the ACC CathPCI Registry. At the data element level, the seven hospitals demonstrated reliability using intra-rater and inter-rater agreement between patient record reviews for two abstractors – inter-rater reliability for eligibility for CR – 95.0% (Kappa 0.77); referral to CR – 84.0% (Kappa 0.70); exceptions – 97.0% (Kappa 0.79). At the measure score level, a signal-to-noise analysis for both registries scored 0.99, above the accepted threshold of 0.7 for reliability.
- To demonstrate validity of the measure, the developer provided face validity. The measure score was assessed by 27 expert panel members of three ACC or AHA committees; 93.0% of the expert panel strongly supported the measure to accurately distinguish good and poor quality. The developer stated that they aim to obtain additional empirical validity testing data for future iterations of this measure as time allows.
- The Committee accepted the prior reliability and validity evaluation without further discussion because there was no updated testing since the last submission.

---

## **3. Feasibility: H-1; M-15; L-1; I-0**

(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/unintended consequences identified 3d. Data collection strategy can be implemented)

### Rationale:

- All the data elements are captured in electronic clinical data. However, the developer states that the data are abstracted from a record by a third party other than the individual obtaining the original information.
- A Committee member expressed concerns with the cost to participate in the CathPCI and ACTION registries and its low participation rate, which may affect feasibility.

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## **4. Use and Usability: The measure meets the Use sub-criterion**

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

4a. Use: **Pass-18; No Pass-0**; 4b. Usability: **H-3; M-13; L-0; I-2**

### Rationale:

- This measure is in use for Professional Certification or Recognition Program ACTION Registry Achievement Award. This measure is also in use by three quality improvement programs for benchmarking or specific to an organization. The quality improvement programs are: (1) NCDR CathPCI registry, (2) NCDR ACTION registry, and (3) ACC Patient Navigator. The developer indicate planned use is public reporting and hopes to expand the use of this measure in other payment programs (e.g., accountable care organizations, Medicare Advantage insurance plans, other health plans on the insurance marketplace).

- The developer stated that ACC has made a decision to voluntarily publicly report out of the ACTION and CathPCI registries.

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## 5. Related and Competing Measures

This measure is related to:

- 0071: Persistence of Beta-Blocker Treatment After a Heart Attack
- 0090: Emergency Medicine: 12-Lead Electrocardiogram (ECG) Performed for Non-Traumatic Chest Pain
- 0137: ACEI or ARB for left ventricular systolic dysfunction- Acute Myocardial Infarction (AMI) Patients
- 0142: Aspirin prescribed at discharge for AMI
- 0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization for patients 18 and older.
- 0290: Median Time to Transfer to Another Facility for Acute Coronary Intervention
- 0643: Cardiac Rehabilitation Patient Referral From an Outpatient Setting
- 0730: Acute Myocardial Infarction (AMI) Mortality Rate
- 0964 Therapy with Aspirin, P2Y12 Inhibitor, and Statin at Discharge Following PCI in Eligible Patients
- 2377: Defect Free Care for AMI
- 2379: Adherence to Antiplatelet Therapy after Stent Implantation
- 2452 PCI: Post-Procedural Optimal Medical Therapy [clinician]
- 2473: Hospital 30-Day Risk-Standardized Acute Myocardial Infarction (AMI) Mortality eMeasure

The Committee was not able to discuss these measures during the January 29 web meeting and will have an opportunity to discuss the measures on the post-comment call on April 19, 2018.

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**Standing Committee Recommendation for Endorsement: Y-17; N-0**

## 6. Public and Member Comment

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

## 8. Appeals

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### 0643 Cardiac Rehabilitation Patient Referral From an Outpatient Setting

[Submission](#) | [Specifications](#)

**Description:** Percentage of patients evaluated in an outpatient setting who in the previous 12 months have experienced an acute myocardial infarction or chronic stable angina or who have undergone coronary artery bypass (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery (CVS), or cardiac transplantation, who have not already participated in an early outpatient cardiac rehabilitation/secondary prevention program for the qualifying event, and who are referred to an outpatient cardiac rehabilitation/secondary prevention program.

**Numerator Statement:** Number of patients in an outpatient clinical practice who have had a qualifying event/diagnosis during the previous 12 months, who have been referred to an outpatient Cardiac Rehabilitation/Secondary Prevention (CR/SP) program. (Note: The program may include a traditional CR/SP program based on face-to-face interactions and training sessions or may include other options such as home-based approaches. If alternative CR/SP approaches are used, they should be designed to meet appropriate safety standards and deliver effective, evidence-based services.)

**Denominator Statement:** Number of patients in an outpatient clinical practice who have had a qualifying cardiovascular event in the previous 12 months and who do not meet any of the criteria listed in the denominator exclusion section below, and who have not participated in an outpatient cardiac rehabilitation program since the qualifying event/diagnosis.

**Exclusions:** Exceptions criteria require documentation of one or more of the following factors that may prohibit cardiac rehabilitation participation: Medical factors (e.g., patient deemed by provider to have a medically unstable, life-threatening condition). Health care system factors (e.g., no cardiac rehabilitation/secondary prevention (CR/SP) program available within 60 min of travel time from the patient's home).

The only exclusion criterion for this measure is noted below: Patients already referred to CR from another provider/facility and/or was participating in CR prior to encounter with provider at the current office/facility.(1) When the provider discusses CR/SP referral with the patient, if the patient indicates that he/she has already been referred to CR/SP, then that provider would not be expected to make another referral. However, the provider should document that information in the medical record.

**Adjustment/Stratification:** No risk adjustment or risk stratification.

**Level of Analysis:** Clinician : Group/Practice, Clinician : Individual, Integrated Delivery System

**Setting of Care:** Outpatient Services

**Type of Measure:** Process

**Data Source:** Electronic Health Records, Registry Data

**Measure Steward:** American College of Cardiology

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## STANDING COMMITTEE MEETING 01/30/2018

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

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

1a. Evidence: **Accepted prior evaluation**; 1b. Performance Gap: **H-5; M-8; L-3; I-1**;

#### Rationale:

- The developer cited systematic reviews of six ACCF/AHA guidelines with grading of the evidence for referral to cardiac rehabilitation for different heart disease/conditions. No QQC is provided for each of the six guidelines, but evidence grades are defined.
- The developer stated that two new studies were added to evidence, an AHA/ACC guideline for the management of patients with non-ST-elevation (NSTEMI) acute coronary syndromes (ACS), and a new study conducted from the Cochrane systematic review.
- A Committee member expressed the importance of this measure and several agreed with the moderate rating. The Committee accepted the prior evaluation without further discussion.
- The developer provided 2015-2016 performance scores from the ACC PINNACLE registry. For 2015, the mean was 5.51% based on data from 4,954 providers and 27,0448 patients. For 2016, the mean was 5.42% based on data from 2,752 providers and 21,6773 patients.

- The developer also provided 2015-2016 disparities data that were stratified by gender, age, insurance status, and race as mean results and decile. The data demonstrated a range of 0-9.73% for 2015 and a range of 0-1.56% in 2016. The Committee expressed its support for this measure because this is one of the few ambulatory measures that examines disparities, thereby providing needed information on current gaps and playing an important role in providing population health information.

---

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

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity; 2c. For composite measures: Empirical Analysis Supporting Composite))

2a. Reliability: **Accepted prior evaluation**; 2b. Validity: **M-17; L-1; I-1**

### Rationale:

- The developer performed data element and measure score reliability testing by conducting intra- and inter-rater reliability using pooled abstracted data from the Cardiac Rehabilitation Referral Performance Measure from an outpatient setting and a signal-to-noise analysis using PINNACLE 2012 data. The developer presented data with an intra-rater percent agreement ranging from 96.0-100.0% with the Kappa ranging from 0.76-1.0 and inter-rater percent agreement ranging from 86.0-97.0% with the Kappa ranging from 0.65-0.89 for the various aspects of the measure. The developer also found a signal-to-noise ratio of 0.99 for all quartiles. The Committee accepted the prior evaluation of the reliability criteria without further discussion.
- Face validity of the measure score was assessed by 27 members of three separate ACC and AHA committees. It was determined that 93.0% of respondents either agree or strongly agree that the outpatient measure can accurately distinguish good and poor quality.
- The Committee expressed this is an important measure, however, recommended improving the documentation of this measure.

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## **3. Feasibility: H-2; M-17; L-0; I-0**

(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/unintended consequences identified 3d. Data collection strategy can be implemented)

### Rationale:

- Some of the data elements are captured in electronic clinical data, but the developer mentioned that ACC is currently developing a common data dictionary mapped to coded terminology standards that may improve interoperability with EHRs and potentially create eMeasures. However, the developer states that the data are abstracted from a record by a third party other than the individual obtaining the original information.
- The Committee did not have any concerns with the feasibility of the measure.

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## **4. Use and Usability: The measure meets the Use sub-criterion**

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

4a. Use: **Pass-18; No Pass-0**; 4b. Usability: **H-0; M-19; L-0; I-0**

#### Rationale:

- This measure is in use publicly on Physician Compare, payment program, and quality improvement. The quality improvement program, specifically PINNACLE Registry is in use for benchmarking or specific to an organization. The developer noted that this measure is also in use in the Merit-based Incentive Payment System (MIPS), a payment program, which is part of the quality payment program (QPP).
- The Committee recommended that the measure be implemented beyond cardiology, and to be use in other settings (e.g., primary care settings); and increase use of the information by the public. The Committee also recommended that the developer provide additional data regarding the impact of this measure in increasing cardiac rehabilitation referrals.

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### **5. Related and Competing Measures**

This measure is related to:

- 0071: Persistence of Beta-Blocker Treatment After a Heart Attack
- 0090: Emergency Medicine: 12-Lead Electrocardiogram (ECG) Performed for Non-Traumatic Chest Pain
- 0137: ACEI or ARB for left ventricular systolic dysfunction- Acute Myocardial Infarction (AMI) Patients
- 0142: Aspirin prescribed at discharge for AMI
- 0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization for patients 18 and older.
- 0290: Median Time to Transfer to Another Facility for Acute Coronary Intervention
- 0642: Cardiac Rehabilitation Patient Referral From an Inpatient Setting
- 0730: Acute Myocardial Infarction (AMI) Mortality Rate
- 0964 Therapy with Aspirin, P2Y12 Inhibitor, and Statin at Discharge Following PCI in Eligible Patients
- 2377: Defect Free Care for AMI
- 2379: Adherence to Antiplatelet Therapy after Stent Implantation
- 2452 PCI: Post-Procedural Optimal Medical Therapy [clinician]
- 2473: Hospital 30-Day Risk-Standardized Acute Myocardial Infarction (AMI) Mortality eMeasure

The Committee was not able to discuss these measures during the January 29 web meeting and will have an opportunity to discuss the measures on the post-comment call on April 19, 2018.

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**Standing Committee Recommendation for Endorsement: Y-19; N-0**

### **6. Public and Member Comment**

### **7. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

### **8. Appeals**

## Measures Where Consensus Is Not Yet Reached

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### 3309 Risk-Standardized Survival Rate (RSSR) for In-Hospital Cardiac Arrest

[Submission](#) | [Specifications](#)

**Description:** This measure estimates a hospital -level risk standardized survival rate (RSSR) for patients aged 18 years and older who experience an in-hospital cardiac arrest.

**Numerator Statement:** Patients who were alive at discharge

**Denominator Statement:** Patients aged 18 years and older with in-hospital cardiac arrest who received chest compression and/or defibrillation

**Exclusions:** None

**Adjustment/Stratification:** Statistical risk model

**Level of Analysis:** Facility

**Setting of Care:** Emergency Department and Services, Inpatient/Hospital

**Type of Measure:** Outcome

**Data Source:** Registry Data

**Measure Steward:** American Heart Association

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### STANDING COMMITTEE MEETING 01/31/2018

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

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

1a. Evidence: **Y-17; N-2**; 1b. Performance Gap: **H-4; M-11; L-1; I-3**

Rationale:

- The developer outlines several care processes that can be undertaken by the provider to influence patient survival at discharge, such as the utilization of increased training of staff in resuscitation procedures (including the use of mock codes), earlier recognition of patients in cardiac arrest and shorter staff response time, and improved quality of chest compressions. The developer noted that survival rates post-in-hospital cardiac arrest have shown improvement with facility participation in the Get With The Guidelines-Resuscitation Registry (from 16.0% up to 24.0% from 2010 to 2013), which could be linked to improved resuscitation care (Girota, et. al., 2012).
- The Committee noted the documentation provided supported the developer's claim but did not prove it. However, the Committee agreed that there was evidence to support this measure despite the limitations outlined by the literature and developer.
- Based on the performance of 312 hospitals, the developer cited a mean of 0.24. The Committee expressed concerns that the sample was not large or diverse enough to truly capture the current performance gap, however, agreed there was enough information to determine that there was a gap in this area.

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## **2. Scientific Acceptability of Measure Properties: Consensus was not reached on the Reliability portion of the Scientific Acceptability criteria**

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity; 2c. For composite measures: Empirical Analysis Supporting Composite))

2a. Reliability: **H-0; M-11; L-0; I-8**; 2b. Validity: **M-14; L-1; I-4**

Rationale:

- The Committee had several concerns about the specifications. Committee members questioned why the measure was limited to chest compressions and/or defibrillation. The developer stated other incidents, such as ventricular fibrillation, were too uncommon to include in the measure. The Committee also noted the absence of a "transferred" category in the specifications. The developer clarified that patients who are transferred to another facility are treated as leaving the hospital alive.
- The developer provided reliability testing at the performance measure score level. Signal-to-noise ratio testing was conducted by fitting a hierarchical, logistic regression model to derive the two shape parameters – alpha and beta; the model was built on a specified beta-binomial distribution. This modeling was done on patient-level data, adjusting for age, gender, location of arrhythmia (i.e., ICU, ED), type of heart rhythm, and present on arrival (POA) conditions.
- A total of 326 hospitals reported on this measure. Of these, 312 hospitals had all the required data elements and met the minimum number of quality reporting events (1) for inclusion in the analysis. The developer found a signal-to-noise ratio reliability of 0.70, at the average number of events. At the minimum number of events, reliability was 0.693. When questioned about including only 312 hospitals, the developer stated reporting the measure was optional and the other hospitals did not provide the necessary information.
- A committee member noted there were several discrepancies in the data provided. The developer stated that of the 312 hospitals, the range of cardiac arrest quality reporting events was 1 to 122, and then listed 190 as the average. The developer acknowledged this error and stated the range should be 10 to 1220. Additionally, the developer presented a frequency distribution of ratings, from 1 to 5, with a mean of 6.8. The developer stated this was also incorrect and the mean was actually 3.7.
- Overall, the Committee was not able to come to consensus on the reliability of this measure.
- The developer provided validity testing conducted at the performance measure score level using face validity. The developer stated that 71.0% of the 34 member expert panel either agreed or strongly agreed that this measure can accurately distinguish good and poor quality. The Committee agreed the measure was valid.

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## **3. Feasibility: H-1; M-14; L-1; I-3**

(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/unintended consequences identified 3d. Data collection strategy can be implemented)

Rationale:

- The developer stated that all measure elements are readily available in electronic sources via administrative claims data, and coded by someone other than the person obtaining the original information. The Committee agreed the measure is feasible.

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#### 4. Use and Usability

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

4a. Use: **Pass-16; No Pass-3**; 4b. Usability: **H-1; M-14; L-0; I-3**

##### Rationale:

- The measure is being used in the American Heart Association Get With The Guidelines-Resuscitation Professional Certification or Recognition Program. Participants in the Get With The Guidelines-Resuscitation program have access to their data through the registry (also called the Patient Management Tool), where they are able to query and review results. Additionally, participants receive a separate feedback report, available as a pdf download, of their risk-standardized in-hospital cardiac arrest results.
- The developer states that survival rates after in-hospital cardiac arrest had started to improve prior to the introduction of the feedback reports regarding results on the risk-standardized in-hospital cardiac arrest survival.
- Overall, the Committee agreed the measure met the Use and Usability criterion.

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#### 5. Related and Competing Measures

- No related or competing measures noted.

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**Standing Committee Recommendation for Endorsement: Y-X; N-X**

##### Rationale

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#### 6. Public and Member Comment

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

#### 8. Appeals



## Appendix B: Cardiovascular Portfolio—Use in Federal Programs

| NQF # | Title  | Federal Programs: Finalized as of February 2018  |
|-------|--|--|
| 0018  | Controlling High Blood Pressure  | Initial Core Set of Health Care Quality Measures for Medicaid-Eligible Adults; Merit-based Incentive Payment System (MIPS) |
| 0028  | Preventive Care & Screening: Tobacco Use: Screening & Cessation Intervention   | Medicare Shared Savings Program (MSSP)   |
| 0066  | Chronic Stable Coronary Artery Disease: ACE Inhibitor or ARB Therapy--Diabetes or Left Ventricular Systolic Dysfunction (LVEF <40%)                  | MIPS   |
| 0067  | Chronic Stable Coronary Artery Disease: Antiplatelet Therapy   | MIPS   |
| 0068  | Ischemic Vascular Disease (IVD): Use of Aspirin or another Antithrombotic  | MIPS; MSSP   |
| 0070  | Chronic Stable Coronary Artery Disease: Beta-Blocker Therapy--Prior Myocardial Infarction (MI) or Left Ventricular Systolic Dysfunction (LVEF <40%)  | MIPS   |
| 0071  | Persistence of Beta-Blocker Treatment After a Heart Attack   | MIPS   |
| 0081  | Heart Failure: Angiotensin-Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) Therapy for Left Ventricular Systolic Dysfunction | MIPS   |
| 0083  | Heart Failure : Beta-blocker therapy for Left Ventricular Systolic Dysfunction   | MIPS   |
| 0643  | Cardiac Rehabilitation Patient Referral From an Outpatient Setting   | MIPS   |
| 0670  | Cardiac stress imaging not meeting appropriate use criteria: Preoperative evaluation in low risk surgery patients                                    | MIPS   |
| 0671  | Cardiac stress imaging not meeting appropriate use criteria: Routine testing after percutaneous coronary intervention (PCI)                          | MIPS   |
| 0672  | Cardiac stress imaging not meeting appropriate use criteria: Testing in asymptomatic, low risk patients  | MIPS   |
| 1525  | Chronic Anticoagulation Therapy  | MIPS   |
| 2474  | Cardiac Tamponade and/or Pericardiocentesis Following Atrial Fibrillation Ablation   | MIPS   |

## Appendix C: Cardiovascular Standing Committee and NQF Staff

### STANDING COMMITTEE

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Project Analyst

## Appendix D: Measure Specifications

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### 0133 In-Hospital Risk Adjusted Rate of Mortality for Patients Undergoing PCI

#### STEWARD

American College of Cardiology

#### DESCRIPTION

Risk adjusted rate of mortality for all patients age 18 and over undergoing PCI.

#### TYPE

Outcome

#### DATA SOURCE

Registry Data National Cardiovascular Data Registry Percutaneous Coronary Interventions  
Available at measure-specific web page URL identified in S.1  
Attachment cathpci\_v4\_codersdictionary\_4-4.pdf

#### LEVEL

Facility

#### SETTING

Inpatient/Hospital

#### NUMERATOR STATEMENT

Patients 18 years of age and older with a PCI procedure performed during episode of care who expired

#### NUMERATOR DETAILS

PCI=yes

Coding instructions to identify patients in the numerator: indicate if the patient had a percutaneous coronary intervention (PCI) Selection options: yes/no

Supporting definitions: PCI: A percutaneous coronary intervention (PCI) is the placement of an angioplasty guide wire, balloon, or other device (e.g. stent, atherectomy, brachytherapy, or thrombectomy catheter) into a native coronary artery or coronary bypass graft for the purpose of mechanical coronary revascularization. Source: NCDR

AND

Discharge status=deceased

Response options: Alive/deceased

#### DENOMINATOR STATEMENT

Patients 18 years of age and older with a PCI procedure performed during episode of care.

#### DENOMINATOR DETAILS

PCI=yes

Coding instructions for identifying the measure's denominator: indicate if the patient had a percutaneous coronary intervention (PCI); Selection options: yes/no

Supporting definitions: PCI: A percutaneous coronary intervention (PCI) is the placement of an angioplasty guide wire, balloon, or other device (e.g. stent, atherectomy, brachytherapy, or thrombectomy catheter) into a native coronary artery or coronary bypass graft for the purpose of mechanical coronary revascularization. Source: NCDR

AND

Age $\geq$ 18: patients must be 18 years of age to be included in the registry.

## EXCLUSIONS

1. NCDR Registry patients who did not have a PCI (Patient admissions with a diagnostic cath only during that admission);
2. Patient admissions with PCI who transferred to another facility on discharge

## EXCLUSION DETAILS

See coding instructions for defining a PCI in S.5, which also apply to the denominator. In addition, it is important to note that all data submissions must pass the data quality and completeness reports to be included. Note: If one or two variables are missing, the value is imputed for certain characteristics. In our data quality program, all key variables in the risk model have a high "inclusion" criteria. This means that, when a hospital submits data to us, they need to have a high level of completeness (around 95-99%) for those variables. If they are not able to meet the criteria in our data quality program, they do not receive risk-adjusted mortality for any of the records they submitted for that quarter.

## RISK ADJUSTMENT

Other. We have used hierarchical logistic regression to calculate the risks for peri-procedural mortality and use these data to create risk-standardized event rates.

## STRATIFICATION

N/A: We do not use univariate categorizations to apply the measure to subsets of the population. Rather, we use a statistical risk model to integrate all patient characteristics prior to calculating the outcome.

## TYPE SCORE

Rate/proportion better quality = lower score

## ALGORITHM

1. Remove hospitals who fail data quality and completeness reports as outlined in the NCDR Data Quality Program (further discussed in the Testing Supplement and described in section S.9 above)
2. Count of admissions from data submissions that pass NCDR data inclusion thresholds.
3. Remove patient's subsequent PCIs during the same admission (if the patient had more than one PCI procedure during that admission). (Note: The measure consists of the first PCI in a hospital stay and subsequent PCI in that stay are not included in the denominator)
4. Remove admissions without PCI during admission
5. Remove patient admissions with PCI who transferred to another facility on discharge;

6. Calculate measure using weight system based on predictive variables as outlined in the accompanying testing documents and supplemental materials.

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ACC realizes the various NCDR endorsed measures are not readily available on their own main webpage. However, ACCF plans to update their main webpage (cardiosource.org) to include the macrospecifications of the NQF endorsed measures. ACC hopes to work collaboratively with NQF to create a consistent and standard format would be helpful for various end users. In the interim, the supplemental materials include the details needed to understand this model.

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### **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**

#### STEWARD/DEVELOPER

American College of Cardiology

#### DESCRIPTION

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 with STEMI or 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 cohort was derived in a Medicare fee-for-service (FFS) population of patients 65 years of age or older with a PCI. For the purpose of maintenance, the measure used a cohort of patients whose vital status was determined from the National Death Index (which 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.

#### TYPE

Outcome

#### DATA SOURCE

Claims, Other, Registry Data Data sources:

NCDR CathPCI Registry

Vital Status Source:

National Death Index, Death Masterfile, Medicare enrollment database, or equivalent

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

Attachment PCI\_mortality\_STEMI\_Final-\_With\_NDI\_Data\_03Nov2017.xlsx

#### LEVEL

Facility, Other

## SETTING

Inpatient/Hospital

## NUMERATOR STATEMENT

The outcome for this measure is all-cause death within 30 days following a PCI procedure in patients with STEMI or cardiogenic shock at the time of the procedure.

## NUMERATOR DETAILS

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 testing 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.

## 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, with STEMI or cardiogenic shock at the time of procedure, including outpatient and observation stay patients who have undergone PCI but have not been admitted. It is unlikely that patients in this cohort would not be admitted to the hospital, but we keep this criterion to be consistent with the complementary non-STEMI, non-cardiogenic shock PCI cohort.

## DENOMINATOR DETAILS

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 have STEMI or 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)

## 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.

#### EXCLUSION DETAILS

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 NDI and CathPCI registry data)
- (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

#### RISK ADJUSTMENT

Statistical risk model

#### STRATIFICATION

Results of this measure will not be stratified.

#### TYPE SCORE

Rate/proportion better quality = lower score

#### ALGORITHM

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.6, S.7, S.8, S.9, S.10);
- 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<sup>2</sup> increments)
3. History of cerebrovascular disease
4. History of chronic lung disease
5. Glomerular Filtration Rate (GFR) (derived)
6. Previous PCI
7. Heart Failure - current status
8. Cardiogenic shock on admission
9. Symptom onset
10. Ejection Fraction percent (EF)
11. PCI status
12. Highest risk lesion – coronary artery segment category
13. 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.

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ACC realizes the various NCDR endorsed measures are not readily available on their own main webpage. However, ACCF plans to update their main webpage (cardiosource.org) to include the macro-specifications of the NQF endorsed measures. ACC hopes to work collaboratively with NQF to create a consistent and standard format would be helpful for various end users. In the interim, the supplemental materials include the details needed to understand this model.

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## 0642 Cardiac Rehabilitation Patient Referral From an Inpatient Setting

### STEWARD/DEVELOPER

American College of Cardiology

### DESCRIPTION

Percentage of patients admitted to a hospital with a primary diagnosis of an acute myocardial infarction or chronic stable angina or who during hospitalization have undergone coronary artery bypass (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery (CVS), or cardiac transplantation who are referred to an early outpatient cardiac rehabilitation/secondary prevention program.

### TYPE

Process

### DATA SOURCE

Electronic Health Records, Paper Medical Records, Registry Data American College of Cardiology PINNACLE registry and AACVPR/ACC/AHA Cardiac Rehabilitation Testing (CR3) Project.

Available in attached appendix at A.1

Attachment action\_v2\_codersdictionary\_2-4-2--rebranded-  
\_\_AND\_cathpci\_v4\_codersdictionary\_4-4.pdf

### LEVEL

Facility, Clinician : Group/Practice, Clinician : Individual

### SETTING

Inpatient/Hospital

### NUMERATOR STATEMENT

Number of eligible patients with a qualifying event/diagnosis who have been referred to an outpatient Cardiac Rehabilitation/Secondary Prevention (CR/SP) program prior to hospital discharge or have a documented medical or system reason why such a referral was not made.

(Note: The program may include a traditional CR/SP program based on face-to-face interactions and training sessions or may include other options such as home-based approaches. If alternative CR/SP approaches are used, they should be designed to meet appropriate safety standards and deliver effective, evidence-based services.)

## NUMERATOR DETAILS

Qualifying events include all patients hospitalized with primary diagnosis of myocardial infarction (MI), chronic stable angina, or who during hospitalization have undergone coronary artery bypass graft surgery (CABG), percutaneous coronary intervention (PCI), cardiac valve surgery, and/or heart transplantation.

A referral is defined as an official communication between the healthcare provider and the patient to recommend and carry out a referral order to an early outpatient cardiac rehabilitation program. This includes the provision of all necessary information to the patient that will allow the patient to enroll in an early outpatient cardiac rehabilitation program. This also includes a communication between the healthcare provider or healthcare system and the cardiac rehabilitation program that includes the patient's enrollment information for the program. A hospital discharge summary or office note may be potentially formatted to include the necessary patient information to communicate to the cardiac rehabilitation program [the patient's cardiovascular history, testing, and treatments, for instance.] All communications must maintain appropriate confidentiality as outlined by the 1996 Health Insurance Portability and Accountability Act (HIPAA).

## DENOMINATOR STATEMENT

Number of hospitalized patients in the reporting period hospitalized with a qualifying cardiovascular disease event/diagnosis who do not meet any of the criteria listed in the denominator exclusion section below.

## DENOMINATOR DETAILS

Patients with a qualifying event who are to be discharged for a short-term stay in an inpatient medical rehabilitation facility are still expected to be referred to an outpatient cardiac rehabilitation program by the inpatient team during the index hospitalization. This referral should be reinforced by the care team at the medical rehabilitation facility.

## EXCLUSIONS

Exceptions criteria require documentation of one or more of the following factors that may prohibit cardiac rehabilitation participation:

- Medical factors (e.g., patient deemed by provider to have a medically unstable, life-threatening condition).

- Health care system factors (e.g., no cardiac rehabilitation/secondary prevention (CR/SP) program available within 60 min of travel time from the patient's home).

The only exclusion criterion for this measure is noted below:

- Patients who expired before discharge.

## EXCLUSION DETAILS

Exclusion:

There is only one exclusion criteria (patients who expired before discharge). This information is readily available within the medical record.

Exceptions:

All eligible patients who can participate in even a low intensity exercise program and who have the cognitive ability to carry out the individualized education and counseling to life-long secondary prevention efforts should be referred to cardiac rehabilitation/secondary prevention

programs, because morbidity and mortality benefits extend to nearly all patient populations, regardless of age or co-morbidities. As a result, the exception examples included in the performance measure relate to either the patient's inability to attend an exercise program (due to physical or practical obstacles) or to cognitive deficits which make them unable to actively participate in exercise or to apply secondary prevention recommendations.

Examples, justification, and data collection issues for exceptions for this measure;

1. Medical factors (e.g., patient deemed by provider to have a medically unstable, life-threatening condition): Medically unstable, life-threatening conditions are contraindications to aerobic exercise and require medical efforts to stabilize and reverse those conditions, rather than efforts directed at secondary prevention of cardiovascular disease. Objective criteria for contraindications to exercise training are included in AHA, ACC, and AACVPR statements and guidelines, which are readily available to practicing clinicians and abstractors. After the condition has been stabilized or reversed, then referral to CR/SP is appropriate. Providers document the specific reason for this exception in clinical notes, summaries and problem lists, which can be abstracted.

2. Health care system factors (e.g., no cardiac rehabilitation program available within 60 minutes of travel time from the patient's home): Although some patients may do so, it is not practical to expect a patient to drive for 2 hours 2 or 3 times per week in order to attend a program that lasts for 1 to 2 hours and research has shown that distance to CR/SP is inversely correlated with attendance. We chose 60 minutes (assuming average 30 mph driving speed) based on published data showing that the adjusted odds ratio (OR) to attend CR/SP decreased as the distance from patient zip code to nearest CR/SP facility increased, with the greatest decline between 10.2 (6.5-14.9) miles (OR 0.58) to 31.8 (15.0-231.0) miles (OR 0.29). Although alternative delivery models such as those using telemedicine or home care may be developed in future to provide CR/SP, currently there is no reimbursement for these programs. Therefore, it is unreasonable to hold the provider responsible to refer a patient to a program that he/she is highly unlikely to attend. Providers can determine availability of CR/SP programs from on-line or local resources and document this exception in the medical record. Abstractors can verify the exceptions by cross-referencing the patient's address with publicly available lists of CR/SP program locations.

#### RISK ADJUSTMENT

No risk adjustment or risk stratification

#### STRATIFICATION

Measure was not stratified. Since all patient sub-groups are reported to have low referral rates and low utilization rates for cardiac rehabilitation services, there is no specific requirement to report data on this performance measure in a stratified format. However, medical centers are encouraged to utilize any stratification of their data as they use the performance measure to identify suboptimal processes and also subgroups at particular risk that are under their care. Such stratification could include stratification by gender, ethnicity, and/or age, since these variables have been found to identify subpopulations that are at particular risk for non-referral to CR/SP in some cities and regions.

#### TYPE SCORE

Rate/proportion better quality = higher score

## ALGORITHM

ACC CathPCI Registry calculation:

US HOSP= YES

Discharge date= present

Discharge location=present

Discharge referral= present

Discharge status= present

Exclude any of the below:

-Death

-PCI  $\leq 0$

-"NULL" values

ACTION GWTG Registry calculation:

US HOSP= YES

Discharge date= present

Discharge location=present

Discharge referral= present

Discharge status= present

Exclude any of the below:

-Death

-Comfort measure= present

-"NULL" values

AACVPR/ACC/AHA Cardiac Rehabilitation Referral Reliability Testing (CR3) Project:

Hospital ID present = YES

AND

Subject ID = YES

AND

\*Provider NPI = YES

AND

Age at start of measurement period is 18 years or older = YES

AND

Qualifying Event: Myocardial Infarction = YES

OR

Qualifying Event: Coronary Artery Bypass Graft = YES

OR

Qualifying Event: Cardiac Valve Surgery = YES

OR

Qualifying Event: Heart Transplantation = YES

OR

Qualifying Event: Stable Angina = YES

OR

Qualifying Event: PCI-stent = YES

OR

Qualifying Event: PCI- other intervention = YES

AND

Yes, documentation that patient was referred to CR for this event/diagnosis

\*Since the data for the CR3 Project were processed through the NCDR-PINNACLE Center, NPI was used to help process the data in accordance with the software used at the Center, which requires an NPI on each report. However, since the purpose of the CR3 Project was to assess reliability of the chart abstraction process and not to assess the variability of CR/SP referral by providers, we opted to analyze the CR/SP referral rates by site, and to use the site NPI for data processing purposes only.

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### 0643 Cardiac Rehabilitation Patient Referral From an Outpatient Setting

#### STEWARD/DEVELOPER

American College of Cardiology

#### DESCRIPTION

Percentage of patients evaluated in an outpatient setting who in the previous 12 months have experienced an acute myocardial infarction or chronic stable angina or who have undergone coronary artery bypass (CABG) surgery, a percutaneous coronary intervention (PCI), cardiac valve surgery (CVS), or cardiac transplantation, who have not already participated in an early outpatient cardiac rehabilitation/secondary prevention program for the qualifying event, and who are referred to an outpatient cardiac rehabilitation/secondary prevention program.

#### TYPE

Process

#### DATA SOURCE

Electronic Health Records, Registry Data American College of Cardiology PINNACLE registry and AACVPR/ACC/AHA Cardiac Rehabilitation Testing (CR3) Project.

No data collection instrument provided

Attachment pinn\_v1\_datadictionaryfullspecifications\_1-5.pdf

#### LEVEL

Clinician : Group/Practice, Clinician : Individual, Integrated Delivery System

#### SETTING

Outpatient Services

#### NUMERATOR STATEMENT

Number of patients in an outpatient clinical practice who have had a qualifying event/diagnosis during the previous 12 months, who have been referred to an outpatient Cardiac Rehabilitation/Secondary Prevention (CR/SP) program. (Note: The program may include a traditional CR/SP program based on face-to-face interactions and training sessions or may include other options such as home-based approaches. If alternative CR/SP approaches are used, they should be designed to meet appropriate safety standards and deliver effective, evidence-based services.)

#### NUMERATOR DETAILS

All information required to collect/calculate the numerator, including all codes, logic, and definitions):

Qualifying events include all patients who within the past 12 months experienced myocardial infarction (MI), coronary artery bypass graft surgery (CABG), percutaneous coronary intervention (PCI), cardiac valve surgery, heart transplantation, and/or who have a current diagnosis of chronic stable angina. A referral is defined as an official communication between the healthcare provider and the patient to recommend and carry out a referral order to an outpatient CR program. This includes the provision of all necessary information to the patient that will allow the patient to enroll in an outpatient CR program. This also includes a written or electronic communication between the healthcare provider or healthcare system and the cardiac rehabilitation program that includes the patient's enrollment information for the program. A hospital discharge summary or office note may potentially be formatted to include the necessary patient information to communicate to the CR program (e.g., the patient's cardiovascular history, testing, and treatments). According to standards of practice for cardiac rehabilitation programs, care coordination communications are sent to the referring provider, including any issues regarding treatment changes, adverse treatment responses, or new nonemergency condition (new symptoms, patient care questions, etc.) that need attention by the referring provider. These communications also include a progress report once the patient has completed the program. All communications must maintain an appropriate level of confidentiality as outlined by the 1996 Health Insurance Portability and Accountability Act (HIPAA).

#### DENOMINATOR STATEMENT

Number of patients in an outpatient clinical practice who have had a qualifying cardiovascular event in the previous 12 months and who do not meet any of the criteria listed in the denominator exclusion section below, and who have not participated in an outpatient cardiac rehabilitation program since the qualifying event/diagnosis.

#### DENOMINATOR DETAILS

N/A



## EXCLUSIONS

Exceptions criteria require documentation of one or more of the following factors that may prohibit cardiac rehabilitation participation: Medical factors (e.g., patient deemed by provider to have a medically unstable, life-threatening condition). Health care system factors (e.g., no cardiac rehabilitation/secondary prevention (CR/SP) program available within 60 min of travel time from the patient's home).

The only exclusion criterion for this measure is noted below: Patients already referred to CR from another provider/facility and/or was participating in CR prior to encounter with provider at the current office/facility.(1) When the provider discusses CR/SP referral with the patient, if the patient indicates that he/she has already been referred to CR/SP, then that provider would not be expected to make another referral. However, the provider should document that information in the medical record.

## EXCLUSION DETAILS

Exceptions:

All eligible patients who can participate in even a low intensity exercise program and who have the cognitive ability to carry out the individualized education and counseling to life-long secondary prevention efforts should be referred to cardiac rehabilitation/secondary prevention programs, because morbidity and mortality benefits extend to nearly all patient populations, regardless of age or co-morbidities. As a result, the exception examples included in the performance measure relate to either the patient's inability to attend an exercise program (due to physical or practical obstacles) or to cognitive deficits which make them unable to actively participate in exercise or to apply secondary prevention recommendations.

Examples, justification, and data collection issues for exceptions for this measure;

1. Medical factors (e.g., patient deemed by provider to have a medically unstable, life-threatening condition): Medically unstable, life-threatening conditions are contraindications to aerobic exercise and require medical efforts to stabilize and reverse those conditions, rather than efforts directed at secondary prevention of cardiovascular disease. Objective criteria for contraindications to exercise training are included in AHA, ACC, and AACVPR statements and guidelines, which are readily available to practicing clinicians and abstractors. After the condition has been stabilized or reversed, then referral to CR/SP is appropriate. Providers document the specific reason for this exception in clinical notes, summaries and problem lists, which can be abstracted.
2. Health care system factors (e.g., no cardiac rehabilitation program available within 60 minutes of travel time from the patient's home): Although some patients may do so, it is not practical to expect a patient to drive for 2 hours 2 or 3 times per week in order to attend a program that lasts for 1 to 2 hours and research has shown that distance to CR/SP is inversely correlated with attendance. We chose 60 minutes (assuming average 30 mph driving speed) based on published data showing that the adjusted odds ratio (OR) to attend CR/SP decreased as the distance from patient zip code to nearest CR/SP facility increased, with the greatest decline between 10.2 (6.5-14.9) miles (OR 0.58) to 31.8 (15.0-231.0) miles (OR 0.29). Although alternative delivery models such as those using telemedicine or home care may be developed in future to provide CR/SP, currently there is no reimbursement for these programs. Therefore, it is unreasonable to hold the provider responsible to refer a patient to a program that he/she is highly unlikely to attend. Providers can determine availability of CR/SP programs from on-line or local resources and document this exception in the medical record. Abstractors can verify the

exceptions by cross-referencing the patient's address with publicly available lists of CR/SP program locations.

#### RISK ADJUSTMENT

No risk adjustment or risk stratification

#### STRATIFICATION

Measure was not stratified. Since all patient sub-groups are reported to have low referral rates and low utilization rates for cardiac rehabilitation services, there is no specific requirement to report data on this performance measure in a stratified format. However, medical centers are encouraged to utilize any stratification of their data as they use the performance measure to identify suboptimal processes and also subgroups at particular risk that are under their care. Such stratification could include stratification by gender, ethnicity, and/or age, since these variables have been found to identify subpopulations that are at particular risk for non-referral to CR/SP in some cities and regions.

#### TYPE SCORE

Rate/proportion better quality = higher score

#### ALGORITHM

ACC PINNACLE Registry Calculation: Practice ID present= YES AND Provider NPI= YES AND Age at start of measurement period is 18 years or older= YES AND Encounter Date is in the reporting date= YES AND Qualifying Event: Myocardial Infarction (within 12 months) =YES OR Qualifying Event: Coronary Artery Bypass Graft (Within 12 months) = YES OR

Qualifying Event: Cardiac Valve Surgery (Within 12 months)= YES OR Qualifying Event: Heart Transplantation =YES OR Qualifying Event: Stable Angina (within 12 months) AND Current Diagnosis= YES OR Qualifying Event: PCI-stent (within 12 months)= YES OR Qualifying Event: PCI-other (non-stent) intervention= YES AND Yes, Patient already participating in rehab= NO AND Cardiac Rehab Referral or Plan for qualifying event/diagnosis in the past 12 months= YES And Referral Plan Documented= YES

AACVPR/ACC/AHA Cardiac Rehabilitation Referral Reliability Testing (CR3): Hospital ID present = YES AND Subject ID = YES AND \*Provider NPI = YES AND Age at start of measurement period is 18 years or older = YES AND Qualifying Event: Myocardial Infarction = YES OR Qualifying Event: Coronary Artery Bypass Graft = YES OR Qualifying Event: Cardiac Valve Surgery = YES OR Qualifying Event: Heart Transplantation = YES OR Qualifying Event: Stable Angina = YES OR Qualifying Event: PCI-stent = YES OR Qualifying Event: PCI- other intervention = YES AND Yes, documentation that patient was referred to CR for this event/diagnosis \*Since the data for the CR3 Project were processed through the NCDR-PINNACLE Center, NPI was used to help process the data in accordance with the software used at the Center, which requires an NPI on each report. However, since the purpose of the CR3 Project was to assess reliability of the chart abstraction process and not to assess the variability of CR/SP referral by providers, we opted to analyze the CR/SP

referral rates by site, and to use the site NPI for data processing purposes only.

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### 3309 Risk-Standardized Survival Rate (RSSR) for In-Hospital Cardiac Arrest

#### STEWARD/DEVELOPER

American Heart Association

#### DESCRIPTION

This measure estimates a hospital -level risk standardized survival rate (RSSR) for patients aged 18 years and older who experience an in-hospital cardiac arrest.

#### TYPE

Outcome

#### DATA SOURCE

Registry Data American Heart Association (AHA) Get With The Guidelines(R)-Resuscitation (GWTG-R) Registry

Available in attached appendix at A.1

Attachment RSSR\_Specs\_AHA\_FINAL.pdf

#### LEVEL

Facility

#### SETTING

Emergency Department and Services, Inpatient/Hospital

#### NUMERATOR STATEMENT

Patients who were alive at discharge

#### NUMERATOR DETAILS

Target population for the numerator is identified via the Get With The Guidelines (GWTG)—Resuscitation Registry using the time period and data fields below:

Time Period for Data Collection: At each hospital discharge during the measurement period.

‘Discharge Status’ = Alive

#### DENOMINATOR STATEMENT

Patients aged 18 years and older with in-hospital cardiac arrest who received chest compression and/or defibrillation

#### DENOMINATOR DETAILS

Target population for the denominator is identified via the Get With The Guidelines (GWTG)—Resuscitation Registry using the time period and data fields below:

Time Period for Data Collection: 12 consecutive months

‘Age at System Entry’  $\geq$  18 years

AND

‘First documented pulseless rhythm’ = Asystole, Pulseless Electrical Activity (PEA), Pulseless Ventricular Tachycardia, or Ventricular Fibrillation (VF)

AND

‘Did patient receive chest compressions and/or defibrillation during this event?’ = Yes

#### EXCLUSIONS

None

#### EXCLUSION DETAILS

#### RISK ADJUSTMENT

Statistical risk model

#### STRATIFICATION

Not applicable.

#### TYPE SCORE

Other (specify): Risk standardized rate better quality = higher score

#### ALGORITHM

The measure score is calculated as follows:

1. Patients for inclusion are identified using inclusion criteria as described above (S.6 through S.9)
2. Patients meeting the numerator (S.4-S.5) are determined.
3. Variables for inclusion in risk adjustment are pulled.
4. Measure score is calculated using data aggregated from all registry participants, as described below and within the testing attachment.

The measure is adjusted using the variables below:

1. Age
2. Initial cardiac arrest rhythm
3. Hospital location
4. Hypotension
5. Sepsis
6. Metastatic or hematologic malignancy
7. Hepatic insufficiency
8. Mechanical ventilation
9. Intravenous vasopressor

#### Measure Calculation:

- 1) Create a model for predictors of in-hospital cardiac arrest (IHCA). Since patients at a given hospital with IHCA will have correlated outcomes, we use a multivariable hierarchical logistic regression model, wherein patients will be nested within hospitals in the model and hospitals are modeled as random effects.
- 2) A number of demographic (age category, sex) and comorbidity variables (includes pre-existing conditions and interventions in place at the time of cardiac arrest) are considered for model inclusion. Essentially, we consider almost all variables as potential predictors in the model.
- 3) An initial “full” model is generated with significant predictors of survival to discharge.
- 4) Within this initial “full” model, we then work to sequentially eliminate predictors with the smallest contribution to the model. This is done to derive a more parsimonious, or “reduced”, model with 95% of the initial “full” model’s predictive ability – in essence, to create a model with many fewer variables with almost identical predictive (discriminative) ability as the “full” model.
- 5) Model discrimination with the “reduced” model is then assessed with c-statistics, and model validation performed by comparing the R<sup>2</sup> of the predicted and observed plots (this information is described in the next section).
- 6) Once the “reduced” predictive model is confirmed, as above, then one can calculate RSSRs for each hospital. This is accomplished by multiplying the weighted average unadjusted hospital survival rate for the entire study sample by the hospital’s predicted vs. expected survival rate. So, a hospital with a predicted vs. expected survival rate > 1 would have a RSSR higher than the weighted mean, and one with a ratio < 1 would have a RSSR below the weighted mean.
- 7) The expected survival number (denominator) would be determined by applying the model’s regression coefficients for covariates to each patient and summing up the probabilities for all patients within that hospital. This number uses the average hospital-level random intercept in the model.
- 8) The predicted survival number (numerator) is the number of survivors at a hospital, which is determined in the same way as the expected survival except that the hospital’s specific random intercept is used. **Error! MergeField was not found in header record of data source.**

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## **Appendix E: Pre-Evaluation Comments**

As of January 18, 2018, there were no comments received.

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