



Measure Information

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

Brief Measure Information

NQF #: 0695

Corresponding Measures:

De.2. Measure Title: Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)

Co.1.1. Measure Steward: American College of Cardiology

De.3. Brief Description of Measure: This measure estimates a hospital-level risk-standardized readmission rate (RSRR) following PCI for Medicare Fee-for-Service (FFS) patients who are 65 years of age or older. The outcome is defined as unplanned readmission for any cause within 30 days following hospital stays. The measure includes both patients who are admitted to the hospital (inpatients) for their PCI and patients who undergo PCI without being admitted (outpatient or observation stay). A specified set of planned readmissions do not count as readmissions. The measure uses clinical data available in the National Cardiovascular Disease Registry (NCDR) CathPCI Registry for risk adjustment and Medicare claims to identify readmissions. Additionally, the measure uses direct patient identifiers including Social Security Number (SSN) and date of birth to link the datasets.

A hospital stay is when a patient is admitted to the hospital (inpatient) for PCI or receives a procedure at a hospital, but is not admitted as an inpatient (outpatient).

The primary update to this measure since it was last reviewed by the National Quality Forum (NQF) is a more comprehensive specification of planned readmission. Additionally, the updated measure includes a re-specification of variables to reflect changes in the data collection form that occurred when the CathPCI Registry was updated from Version 3.04 (Version 3) to Version 4.3.1 (Version 4). Finally, the measure has been updated to use direct identifiers including SSN and date of birth to link the CathPCI Registry data with corresponding administrative claims data. These updates are described within this application and in the accompanying report re-specifying Hospital 30-Day Readmission Following Percutaneous Coronary Intervention Measure (see Appendix attachment).

1b.1. Developer Rationale: The goal of this measure is to improve patient outcomes by providing patients, physicians, and hospitals with information about hospital-level RSRRs following hospitalization for PCI. Measurement of patient outcomes allows for a broad view of quality of care that encompasses more than what can be captured by individual process-of-care measures. Complex and critical aspects of care, such as communication between providers, prevention of and response to complications, patient safety, and coordinated transitions to the outpatient environment, all contribute to patient outcomes but are difficult to measure by individual process measures. The goal of outcomes measurement is to risk-adjust for patients' conditions at the time of hospital admission and then evaluate patient outcomes. This measure was developed to identify institutions' whose performance is better or worse than would be expected based on their patient case mix, and therefore promote hospital quality improvement and better inform consumers about care quality.

This measure describes hospital-level readmission rates following PCI, with the overriding goal to reduce preventable readmissions to best-in-class (NPP 3.3) and reduce readmissions following hospitalization for relevant conditions to best-in-class (NPP 3.4). The expectation is that providing this information to hospitals, coupled with public reporting of hospitals' results, will drive internal hospital quality improvement efforts to focus efforts on reducing readmissions following hospitalization for PCI. This perspective may motivate hospitals to look for opportunities not only within the organization, but also to better coordinate the transition of care from the inpatient to the outpatient arena.

S.4. Numerator Statement: The outcome for this measure is 30-day all-cause readmission. We define readmission as an acute care inpatient hospital admission for any cause, with the exception of certain planned readmissions, within 30 days from the discharge

date of the index PCI hospitalization or PCI outpatient claim end date (hereafter referred to as discharge). If a patient has more than one unplanned admission within 30 days of discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, then no readmission is counted, regardless of whether a subsequent unplanned readmission takes place. We use this approach because it would potentially be unfair to attribute an unplanned readmission that follows a planned readmission back to the care received during the initial index admission. For more details on how planned readmissions were identified and removed from the outcome, please refer to the Specifications Report in the attached Appendix.

S.6. Denominator Statement: The target population for this includes hospital stays for patients who are 65 years of age or older who receive a PCI and who have matching records in the CathPCI Registry and Medicare claims.

S.8. Denominator Exclusions: The following exclusions were applied to data during the merging of NCDR CathPCI and Medicare datasets:

1. Patients younger than 65 years of age.

Rationale: Patients younger than 65 in the Medicare dataset represent a distinct population that qualifies for Medicare due to disability. The characteristics and outcomes of these patients may be less representative of the larger population of PCI patients. Additionally, patients younger than 65 in the NCDR CathPCI dataset will not have corresponding data in the Medicare claims dataset to obtain the readmission outcome.

2. Patient stays with duplicate fields (NCDR CathPCI and Medicare datasets).

Rationale: Two or more patient stays that have identical information for SSN, admission date, discharge date, and hospital MPN are excluded to avoid making matching errors upon merging of the two datasets.

3. Unmatched patient stays.

Rationale: The measure requires information from both the CathPCI Registry and corresponding Medicare claims data. Accordingly, the measure cannot be applied to patient stays that are not matched in both datasets.

Exclusions applied to the linked dataset:

1. Patients not enrolled in Medicare FFS at the start of the episode of care.

Rationale: Readmission data are currently available only for Medicare FFS patients.

2. Not the first claim in the same claim bundle.

Rationale: Multiple claims from an individual hospital can be bundled together. To ensure that the selected PCI is the index PCI, we exclude those PCI procedures that were not the first claim in a specific bundle. Inclusion of additional claims could lead to double counting of an index PCI procedure.

3. Instances when PCI is performed more than 10 days following admission.

Rationale: Patients who undergo PCI late into their hospitalization represent an unusual clinical situation in which it is less likely that the care delivered at the time of or following the PCI would be reasonably assumed to be associated with subsequent risk of readmission.

4. Transfers out.

Rationale: Patient stays in which the patient received a PCI and was then transferred to another hospital are excluded because the hospital that performed the PCI procedure does not provide discharge care and cannot fairly be held responsible for their outcomes following discharge.

5. In-hospital deaths (the patient dies in the hospital).

Rationale: Subsequent admissions (readmissions) are not possible.

6. Discharges Against Medical Advice (AMA).

Rationale: Physicians and hospitals do not have the opportunity to deliver the highest quality care.

7. PCI in which 30-day follow-up is not available.

Rationale: Patients who are not enrolled for 30 days in fee-for-service Medicare following their hospital stay are excluded because there is not adequate follow-up data to assess readmissions.

8. Admissions with a PCI occurring within 30-days of a prior PCI already included in the cohort.
Rationale: We do not want to count the same admission as both an index admission and an outcome.

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

IF Endorsement Maintenance – Original Endorsement Date: Jan 17, 2011 Most Recent Endorsement Date: Dec 09, 2016

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

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

De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results? This measure is not formally paired with another measure; however, it complements existing measures for 30-day readmission following admissions for acute myocardial infarction (AMI) or heart failure (HF) in that it helps to provide a more complete picture of the outcomes achieved by hospitals across cardiovascular services. The measure also complements the pair of PCI mortality models previously endorsed by NQF in that it is suitable for public reporting and will promote greater investment in quality improvement efforts related to the care of PCI patients.

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

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

1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form
-0695_PCI_Readmission_Measure_NQF_Evidence_Attachment_v1.0_02-05-14_Final.docx

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

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

1b. Performance Gap

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

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

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

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

The goal of this measure is to improve patient outcomes by providing patients, physicians, and hospitals with information about hospital-level RSRRS following hospitalization for PCI. Measurement of patient outcomes allows for a broad view of quality of care that encompasses more than what can be captured by individual process-of-care measures. Complex and critical aspects of care, such as communication between providers, prevention of and response to complications, patient safety, and coordinated transitions to the outpatient environment, all contribute to patient outcomes but are difficult to measure by individual process measures. The goal of outcomes measurement is to risk-adjust for patients' conditions at the time of hospital admission and then evaluate patient outcomes. This measure was developed to identify institutions' whose performance is better or worse than would be expected based on their patient case mix, and therefore promote hospital quality improvement and better inform consumers about care quality.

This measure describes hospital-level readmission rates following PCI, with the overriding goal to reduce preventable readmissions to best-in-class (NPP 3.3) and reduce readmissions following hospitalization for relevant conditions to best-in-class (NPP 3.4). The

expectation is that providing this information to hospitals, coupled with public reporting of hospitals' results, will drive internal hospital quality improvement efforts to focus efforts on reducing readmissions following hospitalization for PCI. This perspective may motivate hospitals to look for opportunities not only within the organization, but also to better coordinate the transition of care from the inpatient to the outpatient arena.

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

At the time of the original measure submission, we noted that the validation sample (2006) consisted of 117,375 admissions at 618 hospitals, with a RSRR of 10.7%. The development sample (2007) consisted of 128,745 admissions, with a RSRR of 11.1%.

Most recently, we analyzed variation in RSRRs among the hospitals in the 2010-2011 data. There were 277,512 admissions to 1,197 hospitals in the combined two-year sample. RSRRs vary among hospitals, with a mean of 11.8%, a standard deviation of 1.3%, and a range of 8.5% to 16.7%. The interquartile range is 10.9% to 12.6%. The range of performance is as follows.

Percentile of RSRR/Mean RSRR

100% Max/16.7%

99%/15.4%

95%/14.1%

90%/13.5%

75% Q3/12.6%

50% Median/11.7%

25% Q1/10.9%

10%/10.1%

5%/9.7%

1%/8.9%

0% Min/8.5

The scores by decile (2010-2011 dataset; 277,512 admissions to 1,197 hospitals in the combined two-year sample.) as are follows:

Decile/Number of patients/Predicted Readmission Rate/Observed Readmission Rate

0/27,751/4.8/4.2%

1/27,751/6.2%/5.5%

2/27,751/7.2%/7.0%

3/27,751/8.2%/8.1%

4/27,751/9.3%/9.5%

5/27,751/10.6%/11.1%

6/27,751/12.2%/12.8%

7/27,751/14.3%/14.8%

8/27,751/17.6%/18.6%

9/27,751/27.1%/26.1%

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

At the time of the original measure submission, we noted that the validation sample (2006) consisted of 117,375 admissions at 618 hospitals. The development sample (2007) consisted of 128,745 admissions. Most recently, we analyzed variation in RSRRs among the hospitals in the 2010-2011 data. There were 277,512 admissions to 1,197 hospitals in the combined two-year sample.

PCI is one of the most commonly performed cardiac procedures in the United States. In 2005, an estimated 1,265,000 PCI procedures were performed in the United States (Rosamond, Flegal et al. 2008). From 1987–2003, the number of procedures increased 326% (Thom, Haase et al. 2006).

The PCI readmission rate is high and varies significantly across hospitals. Readmission within 30 days of PCI is often an unplanned, adverse event. Investigators have reported that approximately one in seven Medicare patients who undergo PCI are readmitted

within 30 days of hospital discharge, and that readmission rates vary substantially across hospitals (Curtis, Schreiner et al. 2009). Analyses we conducted using 2007 Medicare FFS claims data (248,821 Medicare patient admissions at 1,566 hospitals) to assess readmission rates following PCI found high readmission rates and significant variation across hospitals, which suggests that many hospitals could improve readmission rates. These analyses confirmed that crude readmission rates following PCI are high and vary significantly across hospitals, from 0% to 100% with a mean (SD) of 15.5% (10.6%) and a median (quartile range) of 14.5% (11.1%, 18.0%). The readmission rates varied substantially across hospitals. The median unadjusted readmission rates varied substantially across hospitals grouped by their all-cause readmission rate, from 0.0% at the lowest decile to 28.1% at the highest decile. These findings suggest that the majority of readmissions are for non-acute and potentially preventable reasons.

Additionally, about two-thirds of readmissions are directly cardiac related. The most common principal discharge diagnostic code was chronic ischemic heart disease (ICD-9 414.x, 25.4%). However, a small portion of readmissions are for acute cardiovascular conditions such as acute myocardial infarction (5.4%), unstable angina (7.4%), arrhythmia (4.3%), or heart failure (9.7%). These findings suggest that the majority of readmissions are for non-acute and thus potentially preventable reasons.

The Medicare Payment Advisory Committee (MedPAC) has called for hospital-specific public reporting of readmission rates and reports that Percutaneous Transluminal Coronary Angioplasty (PTCA) is one of the seven conditions that make up almost 30% of spending on readmissions. (The term "PCI" captures all coronary interventions, including, for example, PTCA, stents, and atherectomy. PTCA is specific to angioplasty and stents.) MedPAC has also reported that the rate of preventable admissions within 15 days of discharge following PTCA is 10% (44,293 in 2005 at a cost of \$360 million) and has suggested consideration of a PTCA readmission measure (MedPAC 2006).

References

J.P. Curtis, G. Schreiner and Y. Wang et al., All-cause readmission and repeat revascularization after percutaneous coronary intervention in a cohort of Medicare patients, *J Am Coll Cardiol* 54 (2009), pp. 903–907.

Thom, T., N. Haase, et al. (2006). "Heart disease and stroke statistics--2006 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee." *Circulation* 113(6): e85-151.

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

Medicare Payment Advisory Committee (MedPAC) Report to the Congress: Promoting Greater Efficiency in Medicare. Available at http://www.medpac.gov/documents/Jun07_EntireReport.pdf, accessed October 29, 2008.

1b.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability. (*This is required for maintenance of endorsement. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included.*) For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b1) under Usability and Use.

We analyzed whether disparities in performance on this measure exist at the hospital level.

Distribution of PCI RSRRs by Proportion of African-American Patients:

To identify potential disparities, we examined the relationship between hospital-level RSRR and hospital proportion of African-American patients among all hospitals grouped by quintile of the proportion of African-American patients. We used the Medicare Provider Analysis and Review (MEDPAR) File for 2010 to calculate the proportion of African-American patients treated at each hospital, using all patients admitted to each hospital. There were 277,439 admissions to 1,195 hospitals.

Analyses (see attached Appendix) demonstrated that there were modest differences in the RSRRs by quintile. Specifically, the median RSRR for hospitals with the highest proportion of African-American patients was 12.4% compared with 11.2% for hospitals with the lowest proportion of African-American patients. In comparison to the registry average of 11.8%, hospitals with high proportions of African-American patients have modestly higher 30-day RSRRs. However, the distributions for the RSRRs overlapped across hospital quintiles, and many hospitals caring for the highest percentage of African-American patients performed well on the measures.

Distribution of PCI RSRRs by Proportion of Medicaid Patients:

Similarly, to identify potential disparities related socioeconomic status (SES), we examined the relationship between RSRR and hospital proportion of dual eligible patients. We used the MEDPAR File for 2010 to calculate the percentage of patients 65 or older and eligible for both Medicare and Medicaid (dual eligible patients) treated at each hospital. There were 277,439 admissions to 1,195 hospitals. The proportion of dual eligible patients was used as a marker for determining the SES status of hospitals' patients because this is a low income and vulnerable population. Similar to the analysis above, we examined hospital-level RSRRs across quintiles of the proportion of dual eligible patients.

There were no differences in RSRRs across income quintile. Analyses demonstrated that the median RSRR for hospitals in the top quintile of dual eligible patients was 12.3% compared with 11.6% for hospitals in the bottom quintile of dual eligible patients. In comparison to the registry average of 11.8%, hospitals that treat a high percentage of dual eligible patients have moderately higher 30-day RSRRs. However, the distributions for the RSRRs overlapped (Figure 4), and many hospitals in the highest quintile of dual eligible patients performed well on the measure.

Consistent with NQF guidelines, this measure does not risk adjust for race or SES.

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

N/A

2. Reliability and Validity—Scientific Acceptability of Measure Properties

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

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

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

Cardiovascular, Cardiovascular : Coronary Artery Disease (PCI)

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

Care Coordination, Care Coordination : Readmissions, Care Coordination : Transitions of Care, Safety

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

Elderly, Populations at Risk

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

2013 Measure Updates Memo: http://www.ncdr.com/WebNCDR/docs/default-source/analytics-/2013-pci-readmission-updates-memo_4-3-2013.pdf?sfvrsn=2

S.2a. If this is an eMeasure, HQMF specifications must be attached. Attach the zipped output from the eMeasure authoring tool

(MAT) - if the MAT was not used, contact staff. (Use the specification fields in this online form for the plain-language description of the specifications)

[This is not an eMeasure](#) **Attachment:**

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

[Attachment](#) **Attachment:**

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

[No, this is not an instrument-based measure](#) **Attachment:**

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

[Not an instrument-based measure](#)

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

[No](#)

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

[2013 Measure Updates](#)

[1\) Re-specification for CathPCI Registry® Updates:](#)

[a\) Rationale: The measure was initially developed and specified using variables collected in Version 3.04 \(Version 3\) of the CathPCI Registry. In July 2009, the NCDR introduced Version 4.3.1 \(Version 4\) of the registry that included updated data definitions, modifications of previously collected data elements, and the addition of new fields. In order to calculate the measure in contemporary registry data, we re-specified the variables to reflect changes in the data collection form. Overall, the Version 3 variables used in the model could be readily re-specified in Version 4. There were, however, small changes that required coding modifications in the measure SAS pack. For example, in Version 3, the variable 'history of tobacco use' provided 3 options- never, former, and current- and Version 4 has only 2 options- current smoker \(yes/no\). Although different, the new variable still captures the most relevant information.](#)

[To evaluate model performance after the re-specification to Version 4 variables, we compared the odds ratios \(OR\) and c-statistics in 2008 Version 3 data and 2010 Version 4 data. The c-statistic for the 2010, Version 4 model was 0.680. This is a negligible change from the 2008, Version 3 model, which had a c-statistic of 0.676. Odds ratios in both data years are comparable, further indicating that model performance was not significantly altered by re-specification to Version 4 variables. The current model uses Version 4 registry data.](#)

[2\) Revised strategy to link the NCDR® CathPCI Registry® data and Medicare claims](#)

[a\) Rationale: The measure was originally developed and tested using a deterministic match that linked PCI patients in both registry and Medicare claims using indirect identifiers. Since July 2009, participating CathPCI Registry hospitals have voluntarily submitted SSN to the registry. Accordingly, we re-specified the measure to use SSN and other direct identifiers to link registry and Medicare claims data.](#)

[In step 1, SSN is used to identify the patient, discharge date is used to identify the visit, and Medicare Provider Number \(MPN\) is used to identify the correct facility. In this step, all nine SSN digits, discharge date, and MPN must match. Remaining steps are carried out sequentially on patients who were unmatched after the previous step. Steps 2-4 capture patients with SSN transcription errors in one, two, or three digits, respectively. Since SSN discrepancies are allowed in these steps, age and gender are used as additional indirect patient identifiers. In step 5, SSN is removed from consideration, and the direct identifier date of birth \(DOB\) is used with gender, discharge date, and MPN to identify patients in both datasets.](#)

[This approach yields a 94.0% match rate of hospital stays in 2010 for hospitals that appeared in both data sources. Roughly 77% of hospital stays are matched using SSN \(steps 1-4\), and 16% of hospital stays are matched using DOB and gender \(step 5\).](#)

[Using complete SSNs alone to link registry and administrative claims data would have resulted in the exclusion of more than 20% of cases and roughly 10% of hospitals from the measure. The use of a five-step strategy to link the datasets substantially increased the match rate and improves the generalizability of the resulting RSRRs.](#)

3) Updated Approach to Identifying Planned Readmissions

a) Rationale: Unplanned readmissions are acute clinical events experienced by a patient that require urgent rehospitalization. In contrast, planned readmissions are generally not a signal of suboptimal health care quality. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. Furthermore, there is concern that including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge. The original PCI readmission measure identified planned readmissions for coronary artery bypass graft (CABG) and PCI procedures, unless accompanied by an acute primary discharge diagnosis. In the updated measure, we have expanded the definition of planned readmissions to be consistent with other publicly reported readmission measures. This measure uses an algorithm to identify “planned readmissions” that will not count as outcomes in the readmission measure. We compared the crude readmission rate using the original and updated definitions of planned readmissions. Analyzing Medicare Fee-For-Service data from July 2008 to June 2011, the crude 30-day readmission rate using the updated approach was 11.8%, which is 0.5% lower than the 12.3% calculated using the original planned readmission methodology. For details on how the identification of planned readmissions, please see the attached Appendix.

4) Mapped crosswalk between International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) to International Classification of Diseases, 10th Edition, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS)

a) Rationale: In January 2009, the Department of Health and Human Services (HHS) issued a final rule to transition from coding ICD-9-CM to ICD-10-CM/PCS. HHS issued a final rule for mandatory implementation of ICD-10 by October 1, 2014. Operationally, this requires all outpatient claims with dates of service and inpatient claims with dates of discharge on and after October 1, 2014 to utilize ICD-10-CM/PCS codes.

We used the General Equivalence Mappings (GEM) crosswalk and detailed clinical review between ICD-9-CM and ICD10-CM/PCS to create specifications for the PCI readmission measure cohort in ICD-10-CM/PCS. The planned readmission algorithm has not yet been mapped to ICD-10-CM/PCS because the algorithm was not finalized at the time of this crosswalk.

5) Updated cohort codes

a) Rationale: We updated the codes defining the PCI readmission cohort by the assignment of new codes and the removal of retired codes. We added one new ICD-9-CM code (17.55 “transluminal coronary atherectomy”) to identify services rendered in the cohort of the PCI readmission measure. Some ICD-9-CM codes in the original cohort definition were retired. After confirming in the 2010 data that these codes were no longer in use, we removed the ICD-9-CM codes 36.01, 36.02, and 36.05 from the cohort definition.

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

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

The outcome for this measure is 30-day all-cause readmission. We define readmission as an acute care inpatient hospital admission for any cause, with the exception of certain planned readmissions, within 30 days from the discharge date of the index PCI hospitalization or PCI outpatient claim end date (hereafter referred to as discharge). If a patient has more than one unplanned admission within 30 days of discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, then no readmission is counted, regardless of whether a subsequent unplanned readmission takes place. We use this approach because it would potentially be unfair to attribute an unplanned readmission that follows a planned readmission back to the care received during the initial index admission. For more details on how planned readmissions were identified and removed from the outcome, please refer to the Specifications Report in the attached Appendix.

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

IF an OUTCOME MEASURE, describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome

should be described in the calculation algorithm (S.14).

The measure counts readmissions to any acute care hospital for any cause within 30 days of PCI discharge, excluding planned readmissions as defined below.

Planned Readmission Algorithm:

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation);
2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and
3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, Centers for Medicare & Medicaid Services (CMS) applied the algorithm to its other readmission measures. NQF reviewed and endorsed the planned readmission algorithm as applied to the AMI readmission measure during an Ad Hoc review completed in January 2013. The Planned Readmission Algorithm replaced the definition of planned readmissions in the original PCI measure because the algorithm uses a more comprehensive definition. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the AMI readmission measure, CMS used the Planned Readmission Algorithm without making any changes.

Customization for PCI Readmission Measure:

Yale New Haven Health Service Corporation Center for Outcomes Research and Evaluation (YNHHSC/CORE) updated the approach to identifying planned readmissions in the PCI readmission measure by replacing the original NQF-endorsed approach, which only identified revascularization procedures as planned, with a more comprehensive planned readmission algorithm. The revised approach uses a modified version of the Planned Readmission Algorithm Version 2.1 – General Population that has been customized for the PCI patient population. The approach takes into account differences in the likelihood that a procedure is planned depending on whether a coronary stent was implanted during the index PCI procedure.

A working group of YNHHSC/CORE cardiologists and clinicians that developed the Planned Readmission Algorithm reviewed the list of potentially planned procedures in the context of the PCI population. Patients who receive a stent during their PCI require at least four weeks of therapy with aspirin and a platelet inhibitor. During that time period, it is unusual to perform procedures that would require interruption of dual antiplatelet therapy. In contrast, if no stent is deployed, dual antiplatelet therapy is not required, and patients are more likely to undergo planned surgical procedures. Given these considerations, the working group developed different sets of potentially planned procedures for patients with and without stent implantation.

For all readmissions, the measure first identifies readmissions for procedures that are always considered planned (e.g., chemotherapy or organ transplantation [Table PR1, Table PR2]). In the next step, the approach changes depending on whether or not a patient had a stent during the index PCI procedure. If a stent was deployed, the algorithm uses a smaller set of potentially planned procedures (Table PR3) than if a stent was not deployed (Table PR4). All potentially planned procedures identified in both patient populations are then checked for an accompanying primary discharge diagnosis that would more likely than not reflect an acute condition or complication of care (Table PR5).

Analyzing Medicare Fee-For-Service data from July 2008 to June 2011, the crude 30-day measured readmission rate decreased by 0.5% to 11.8%, from 12.3% using the original planned readmission methodology.

Details of the Planned Readmission Algorithm and associated code tables (including Tables PR1-PR5) are attached in data field S.2b (Data Dictionary or Code Table). For more details on the Planned Readmission Algorithm, please see the report titled "2013 Measures Updates and Specifications Report: Hospital 30-Day Readmission Following Percutaneous coronary Intervention Measure" in the Appendix attachment.

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

The target population for this includes hospital stays for patients who are 65 years of age or older who receive a PCI and who have matching records in the CathPCI Registry and Medicare claims.

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

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

This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure cohort.

The time window can be specified for two years. The index cohort includes hospital stays for patients aged 65 or older who receive a PCI and who have matching records in the CathPCI Registry and Medicare claims.

In the CathPCI Registry, eligible admissions are identified with field 5305 (PCI=Yes).

In the Medicare claims, the patient cohort is defined by having one or more of the ICD-9-CM procedure codes and Current Procedural Terminology (CPT) procedure codes listed below.

ICD-9 codes that define the patient cohort:

00.66 Percutaneous transluminal coronary angioplasty or coronary atherectomy

17.55 Transluminal coronary atherectomy

36.06 Insertion of non-drug-eluting coronary artery stent(s)

36.07 Insertion of drug-eluting coronary artery stent (s)

Note: An ICD-9 to ICD-10 crosswalk is attached in field S.2b. (Data Dictionary or Code Table).

CPT codes:

92973 Percutaneous transluminal coronary thrombectomy

92980 Coronary Stents (single vessel)

92981 Coronary Stents (each additional vessel)

92982 Coronary Balloon Angioplasty (single vessel)

92984 Coronary Balloon Angioplasty (each additional vessel)

92995 Percutaneous Atherectomy

92996 Percutaneous Atherectomy

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

The following exclusions were applied to data during the merging of NCDR CathPCI and Medicare datasets:

1. Patients younger than 65 years of age.

Rationale: Patients younger than 65 in the Medicare dataset represent a distinct population that qualifies for Medicare due to disability. The characteristics and outcomes of these patients may be less representative of the larger population of PCI patients. Additionally, patients younger than 65 in the NCDR CathPCI dataset will not have corresponding data in the Medicare claims dataset to obtain the readmission outcome.

2. Patient stays with duplicate fields (NCDR CathPCI and Medicare datasets).

Rationale: Two or more patient stays that have identical information for SSN, admission date, discharge date, and hospital MPN are excluded to avoid making matching errors upon merging of the two datasets.

3. Unmatched patient stays.

Rationale: The measure requires information from both the CathPCI Registry and corresponding Medicare claims data. Accordingly, the measure cannot be applied to patient stays that are not matched in both datasets.

Exclusions applied to the linked dataset:

1. Patients not enrolled in Medicare FFS at the start of the episode of care.

Rationale: Readmission data are currently available only for Medicare FFS patients.

2. Not the first claim in the same claim bundle.

Rationale: Multiple claims from an individual hospital can be bundled together. To ensure that the selected PCI is the index PCI, we exclude those PCI procedures that were not the first claim in a specific bundle. Inclusion of additional claims could lead to double counting of an index PCI procedure.

3. Instances when PCI is performed more than 10 days following admission.

Rationale: Patients who undergo PCI late into their hospitalization represent an unusual clinical situation in which it is less likely that the care delivered at the time of or following the PCI would be reasonably assumed to be associated with subsequent risk of readmission.

4. Transfers out.

Rationale: Patient stays in which the patient received a PCI and was then transferred to another hospital are excluded because the hospital that performed the PCI procedure does not provide discharge care and cannot fairly be held responsible for their outcomes following discharge.

5. In-hospital deaths (the patient dies in the hospital).

Rationale: Subsequent admissions (readmissions) are not possible.

6. Discharges Against Medical Advice (AMA).

Rationale: Physicians and hospitals do not have the opportunity to deliver the highest quality care.

7. PCI in which 30-day follow-up is not available.

Rationale: Patients who are not enrolled for 30 days in fee-for-service Medicare following their hospital stay are excluded because there is not adequate follow-up data to assess readmissions.

8. Admissions with a PCI occurring within 30-days of a prior PCI already included in the cohort.

Rationale: We do not want to count the same admission as both an index admission and an outcome.

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

Exclusions applied to data during the merging of NCDR CathPCI and Medicare datasets:

1. Patients younger than 65 years of age are identified through the date of birth and the date of admission in both the Medicare claims data and CathPCI data.

2. Patient stays with duplicate fields (NCDR CathPCI and CMS datasets) are identified through the linking fields in the matching process.

3. Unmatched patient stays are identified during the matching process.

Exclusions applied to the linked dataset:

1. Patients not enrolled in Medicare FFS at the start of the episode of care are identified through the indicator carried over from the Medicare claims data.

2. Not the first claim in the same claim bundle are identified by an indicator carried over from the Medicare claims when a patient is admitted within one day of the discharge date to the same hospital with the same diagnosis code and in the same group of procedure of PCI.

3. Instances when PCI is performed more than 10 days following admission are identified through the admission date and the procedure date carried over from the CathPCI data.

4. Transfers out to other acute care facilities are identified by indicators carried over from the Medicare claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day.
5. In-hospital deaths are identified using the discharge disposition vital status indicator indicators carried over from the Medicare claims data.
6. Discharges AMA are identified using the discharge disposition indicator carried over from the Medicare claims data.
7. PCI in which 30-day follow-up is not available is identified by patient enrollment status in the CMS' Enrollment Database (EDB).
8. Admissions with a PCI occurring within 30 days of a prior PCI already included in the cohort are identified by comparing the discharge date from the index admission with the readmission date for PCI using indicators carried over from the CathPCI data.

S.10. Stratification Information (Provide all information required to stratify the measure results, if necessary, including the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format with at S.2b.)
Results of this measure will not be stratified.

S.11. Risk Adjustment Type (Select type. Provide specifications for risk stratification in measure testing attachment)
Statistical risk model
If other:

S.12. Type of score:
Rate/proportion
If other:

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

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

The measure employs a hierarchical logistic regression model to create a hospital-level 30-day RSRR. In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals (Normand & Shahian, 2007). At the patient level, the model adjusts the log-odds of readmission within 30 days of discharge for age, sex, and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions 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 readmission or better quality and a higher ratio indicates higher-than-expected readmission or worse quality.

The predicted hospital outcome (the numerator) is the sum of the predicted probabilities of readmission for all patients at a particular hospital. The predicted probability of each patient in that hospital is calculated using the hospital-specific intercept and

patient risk factors. The expected number of readmissions (the denominator) is the sum of the expected probabilities of readmission for all patients at a hospital. The expected probability of each patient in a hospital is calculated using a common intercept and patient risk factors.

Please see Appendix attachment for more details on the calculation algorithm and the value sets for the risk-adjustment variables.

Reference:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.

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

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

N/A. This measure is not based on a sample or survey. Data from all hospitals and all PCI procedures would be included in the process of re-estimating model variables.

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

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

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

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

If other, please describe in S.18.

Claims, Registry Data

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

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

We used the following data sources for initial model development:

1) Medicare Part A data

Part A data refers to claims paid for Medicare inpatient hospital care, outpatient services, skilled nursing facility care, some home health agency services, and hospice care. For this measure, we used Part A data to identify patient stays with a PCI performed either as an inpatient admission or outpatient service. For model development, we used 2007 Medicare Part A data to match patient stays associated with a PCI with comparable data from the CathPCI Registry. For validation, we used 2006 Medicare Part A data to match patient stays with a PCI performed with the corresponding 2006 data from the CathPCI Registry.

2) Medicare Enrollment Database

This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This dataset was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

3) NCDR CathPCI Registry

The CathPCI Registry is the largest voluntary cardiovascular data registry in the United States. The registry captures detailed information about patients at least 18 years of age undergoing cardiac catheterization and PCI. Information collected by the registry includes demographics, comorbid conditions, cardiac status, and coronary anatomy. Hospitals that join the CathPCI Registry agree to submit data for 100% of patients undergoing cardiac catheterization and PCI procedures. These data are collected by hospitals and submitted electronically on a quarterly basis to NCDR.

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

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

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

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

Facility

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

Inpatient/Hospital

If other:

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

N/A

2. Validity – See attached Measure Testing Submission Form

-0695_PCI_Readmission_Measure__NQF_Testing_Attachment__v1.0_02-05-14_Final.docx

2.1 For maintenance of endorsement

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

2.2 For maintenance of endorsement

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

2.3 For maintenance of endorsement

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

3. Feasibility

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

3a. Byproduct of Care Processes

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

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

Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims), Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry)

If other:

3b. Electronic Sources

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

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

endorsement.

ALL data elements are in defined fields in electronic claims

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

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

Attachment:

3c. Data Collection Strategy

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

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

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

As noted, the PCI readmission measure was successfully implemented with voluntary public reporting of hospitals that participate in the NCDR CathPCI Registry. In March 2013, all NCDR CathPCI hospitals received a hospital-specific report (HSR) detailing the results of the measure which included their RSRR, interval estimate, the reasons why patients were readmitted, and the hospitals to which their patients were readmitted. The measure uses data that is already routinely being collected by hospitals participating in the registry. Furthermore, the administrative data used to identify readmissions are routinely collected as part of the billing process. As such this measure did not add any incremental cost to participating sites. We did not experience any feedback from sites regarding issues of patient confidentiality or our approach to missing data.

We received feedback from several hospitals who stated that they erroneously received HSRs stating that they had no eligible cases. After inspecting the data, we determined that these represented cases in which several hospitals submitted cases using the same MPN. In our existing methodology, we excluded these cases due to concerns that we would be unable to accurately attribute cases to a specific hospital. In the future, however, we will be able to overcome this hurdle by using the NCDR's hospital identifiers to correctly attribute cases to hospitals.

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

There are no fees associated with the use of this measure. However, the measure is specified in a manner that requires participation in the NCDR CathPCI registry. Theoretically, one could create a parallel pathway for data submission that would not require registry participation, but this process has not been initiated and would be challenging. For example, there would not be the same efforts to ensure the quality and accuracy of submitted data.

4. Usability and Use

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

4a. Accountability and Transparency

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

4.1. Current and Planned Use

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

Specific Plan for Use	Current Use (for current use provide URL)

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

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

The American College of Cardiology (ACC) has collected data from hospitals about patients who undergo PCI in the CathPCI Registry® as part of the NCDR. In collaboration with Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation and CMS, the ACC provided hospitals with a report that allows them to see information about their PCI readmissions. In addition, hospitals participating in the registry have had the opportunity to voluntarily report their RSRR on both the ACC's website as well as Hospital Compare website.

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

N/A. This measure is currently publicly reported.

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

N/A. This measure is currently publicly reported.

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

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

N/A

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

N/A

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

Describe how feedback was obtained.

N/A

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

N/A

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

N/A

4a2.3. Describe how the feedback described in 4a2.2.1 has been considered when developing or revising the measure

specifications or implementation, including whether the measure was modified and why or why not.

N/A

Improvement

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

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

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

The lack of improvement is expected as information about PCI RSRR was reported to hospitals for the first time in 2013.

4b2. Unintended Consequences

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

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

In the first year of measure implementation, we did find evidence of unintended negative consequences to individuals or populations.

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

Studies suggest that public reporting of the outcomes of cardiovascular procedures may have unintended consequences. Moscucci and colleagues compared the characteristics and outcomes of patients undergoing PCI in states with (New York) and without (Michigan) public reporting and found that patients undergoing PCI in New York were substantially lower risk than PCI patients in Michigan. Determining the underlying causes and appropriateness of these differences is impossible, but there is concern that physicians in states that publicly report PCI outcomes would either refer high risk cases to states without public reporting or avoid such cases altogether. Implementing a national measure of PCI outcomes would avoid the former problem in that public reporting would be consistent across states. Nevertheless, the measure requires close attention to the possibility that high risk patients are not receiving PCI when clinically indicated.

Continued measure implementation will require close attention to data quality. Potential solutions include continued chart audits and attention to variances in case mix.

Reference

Moscucci M, Eagle KA, Share D, et al. Public Reporting and Case Selection for Percutaneous Coronary Interventions: An Analysis From Two Large Multicenter Percutaneous Coronary Intervention Databases. *Journal of the American College of Cardiology*. 2005;45(11):1759-1765.

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

5. Comparison to Related or Competing Measures

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

5. Relation to Other NQF-endorsed Measures

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

Yes

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

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization

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

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

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

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

N/A

5a. Harmonization of Related Measures

The measure specifications are harmonized with related measures;

OR

The differences in specifications are justified

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

Are the measure specifications harmonized to the extent possible?

Yes

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

Please note that we did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure cohort as specified has been publicly reported since 2013. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b. Competing Measures

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

OR

Multiple measures are justified.

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

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

N/A. There are no competing measures.

Appendix

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

Attachment **Attachment:** [-0695_PCI_Readmission_Measure_Appendix_Attachment_FINAL.pdf](#)

Contact Information

Co.1 Measure Steward (Intellectual Property Owner): [American College of Cardiology](#)

Co.2 Point of Contact: [Penelope Solis, comment@acc.org, 202-375-6576-](#)

Co.3 Measure Developer if different from Measure Steward: [Centers for Medicare & Medicaid Services](#)

Co.4 Point of Contact: [Lein, Han, Lein.han@cms.hhs.gov, 410-786-6738-](#)

Additional Information

Ad.1 Workgroup/Expert Panel involved in measure development

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

The measure developer, YNHSC/CORE, obtained expert and stakeholder input on the measure with two groups during original measure development. The team held regular meetings with a Working Group and Technical Expert Panel (TEP).

Working Group:

[Jim Beachy, RCIS](#)

[Ralph Brindis, M.D., M.P.H., F.A.C.C.](#)

[Charles Chambers, M.D.](#)

[Barbara Christensen, R.N., M.H.A.](#)

[Susan Fitzgerald, R.N., M.B.A.](#)

[Joel Harder, M.B.A.](#)

[Tony Hermann, R.N., M.B.A., C.P.H.Q.](#)

[Kathleen Hewitt, R.N., M.S.N., C.P.H.Q.](#)

[Kristi Mitchell, M.P.H.](#)

[Eric Peterson, M.D., M.P.H., F.A.C.C.](#)

[John Rumsfeld, Ph.D., M.D.](#)

[Lara Slattery, M.H.S.](#)

[John Spertus, M.D., M.P.H.](#)

[William Weintraub, M.D.](#)

[Al Woodward, Ph.D., M.B.A.](#)

Technical Expert Panel:

[H.V. 'Skip' Anderson, M.D.](#)

[John Brehm, M.D.](#)

[Vincent J. Bufalino, M.D., F.A.C.C.](#)

[Mary Gregg, M.D., M.H.A.](#)

[Hitinder Gurm, M.D.](#)

[Neil Jensen, MHA, M.B.A.](#)

[Barry K. Lewis, D.O., F.A.C.C.](#)

[Fred Masoudi, M.D., M.S.P.H., F.A.C.C.](#)

[John Rumsfeld, M.D., Ph.D.](#)

[John Santa, M.D., M.P.H.](#)

[Marc E. Shelton, M.D.](#)

#0695 Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI), Last
Updated: Jun 24, 2019

Richard Snow, D.O., M.P.H.
Andrew Weier, B.S., M.A.
Bonnie H. Weiner, M.D., F.S.C.A.I., F.A.C.C.

Measure Developer/Steward Updates and Ongoing Maintenance

Ad.2 Year the measure was first released: 2009

Ad.3 Month and Year of most recent revision: 09, 2013

Ad.4 What is your frequency for review/update of this measure? To be determined by measure steward. Currently, measure stewardship is being transferred from CMS to

Ad.5 When is the next scheduled review/update for this measure? 2014

Ad.6 Copyright statement: N/A

Ad.7 Disclaimers: N/A

Ad.8 Additional Information/Comments: Please note that the next scheduled review/update for this measure is to be determined. We are in the process of transferring the measure stewardship from CMS to ACC. The review/update of this measure will be determined by ACC.