NCDR®
NATIONAL CARDIOVASCULAR DATA REGISTRY

CathPCI Registry®

Professional Level Dashboard User Guide

for Registry Participants

National Cardiovascular Data Registry
800-257-4737
www.ncdr.com • ncdr@acc.org

Author: C. Anderson K. Lavin Updated: 10.14.2021

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Introduction

As part of our ongoing effort to provide meaningful data, improve cardiovascular care, and deliver value to our participants, the NCDR has developed a Professional Level Dashboard. Here, any clinician with a **National Provider Identifier** (**NPI**) number that was captured by the NCDR participating facility, can review their specific data. This online reporting tool uses the provider NPI number to generate reports based on the procedures performed or the care provide by the clinician and submitted by the CathPCI Registry participating hospital.

This dashboard may be used for:

- Quality improvement purposes
- Assists in meeting Quality Payment Program requirements
- Internal reporting

This document is designed to assist participants in becoming familiar with and using the Professional Level Dashboard. We hope this reporting feature will be beneficial to hospitals and cardiovascular care professionals and assist in advancing the care of cardiac patients.

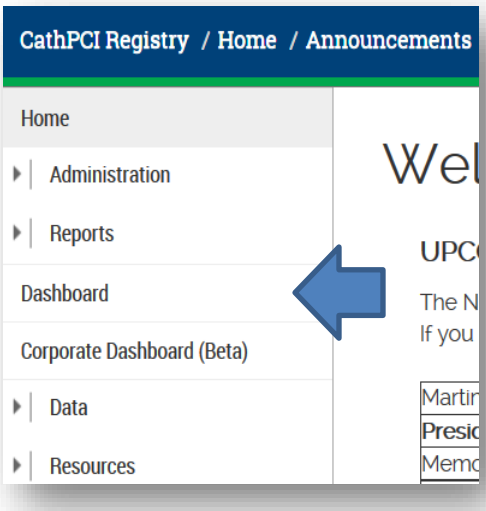
It is recommended that cardiovascular care professionals gain access to their reports by logging into www.acc.org. From this location a report from each CathPCI Registry participating hospital in which care was provided can be viewed. As well, the CV professional can view a consolidated report of their metric results across hospitals. It is also acceptable for reports to be provided by the hospital Registry Site Manager, but this report will be limited to the care delivered at that one hospital. Hospitals are free to give access to the hospital NCDR dashboards to their providers; however, one should be aware that doing so will allow a provider to review the dashboard reports for all providers performing procedures at that hospital.

When a CV professional has questions pertaining to their metric results, it is recommended they work with the Registry Site Manager at the respective hospital to discover which patients comprise the metric numerator and denominator, the facility dashboard will support this query. If additional questions arise, please contact the NCDR Product Support Team at 800-257-4737 or via email at ncdr@acc.org Questions are answered on a first in, first out basis and your patience is appreciated as the CathPCI Registry Team works to address your query.

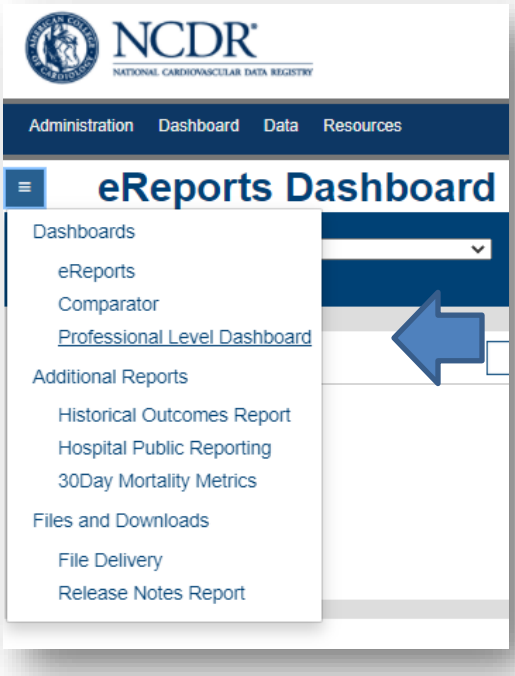
How to Access the Professional Level Dashboard

1. Log onto the CathPCI Registry website via NCDR http://www.ncdr.org/

2. Click on the link for the Dashboard from the left navigation bar

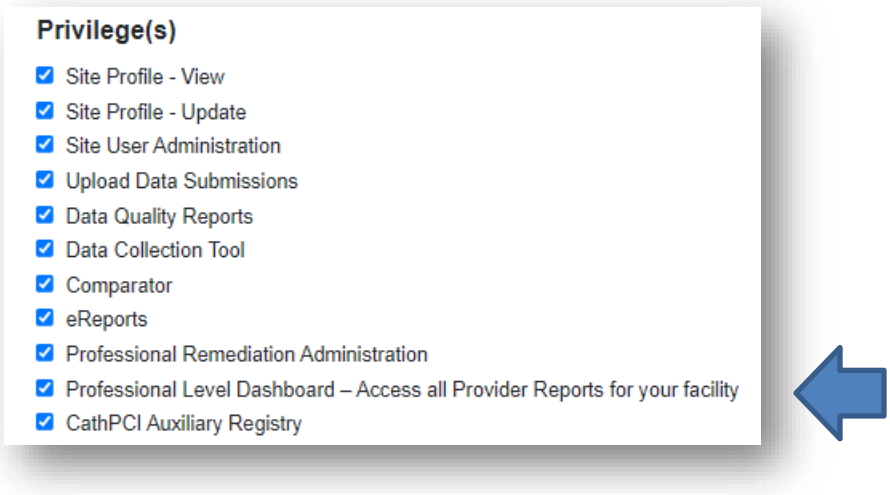


3. From the Hamburger menu, click on the Professional Level Dashboard link



4. Granting access to others: The Registry Site Manager (RSM) will log in, navigate to the CathPCI Registry homepage, and select **Administration** from the left navigation bar, then select **Site User Administration** and locate the users name clicking on **Edit**.

Once on the **User Setup** page, scroll down to **Privileges** and give access by checking the box by **Professional Level Dashboard – Access all Provider Reports for your facility**



Note: *Persons having access to the PLD will be able to see the dashboards for* ***all CV professionals*** *with a valid NPI number performing procedures in the CathPCI Registry facility.*

Dashboard Navigation, Functionality & Information

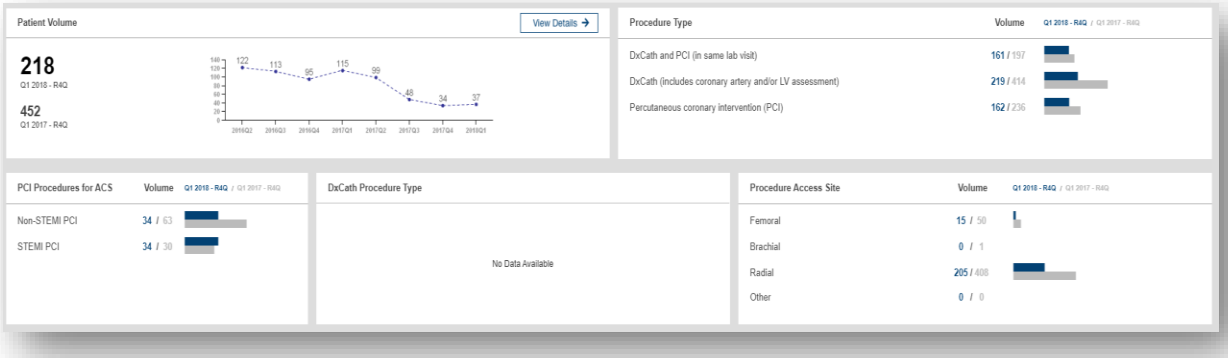
1. Professional Level Dashboard (PLD) landing page select the **Timeframe** (#1) and the **Professional** (#2) to generate the individual report. When the report is generated it can be viewed on the PLD or exported by clicking on "PDF" or "Excel" (top right icons).

The **Category** window can be set to display all metrics (All Categories) or filtered to only show the metrics in a specific category:

Category options:

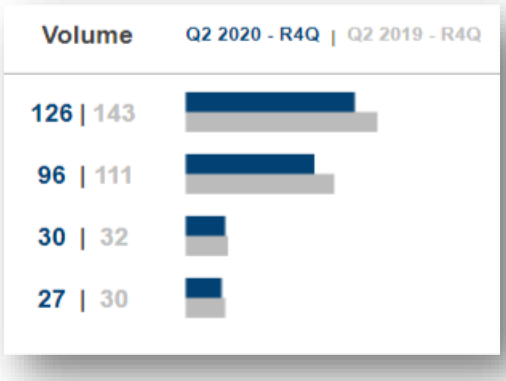
- **PCI Performance Measures** registry performance measures are suitable for public reporting and external comparisons, the PLD has re-created performance measure(s) strictly for provider feedback.
- **Quality Metrics** report information pertaining to both Diagnostic Cath and PCI patients. These metrics support self-assessment and quality improvement.
- **Outcome Metrics** report information pertaining to patient outcomes within the hospitalization.
- **Efficiency Metrics** these measures are not aligned with guidelines, performance measures or AUC but provide feedback on facility utilization like length of stay.
- **Risk Models** NCDR risk models are designed to report facility level data but were modified for the PLD to be used as a rough approximation of individual provider performance for internal quality improvement purposes only.
- **AUC Metrics** report the Appropriate Use Criteria (AUC) rating for eligible PCI procedures performed. The metrics divide the PCI procedures performed into two patient groups: those with Acute Coronary Syndrome (ACS) and those with Stable Ischemic Heart Disease (SIHD). PCI procedures are evaluated as Appropriate, May Be Appropriate or Rarely Appropriate. Procedures with indeterminate or incomplete data or for which there is no AUC Indications are viewed as Unclassifiable.

2. **Volume Summary Table** will display data pertaining to volumes of patients, procedures, ACS PCI distribution, Dx Cath and procedure access type.



Note: *the values displayed are* ***not*** *numerator/denominator but the* ***R4Q*** *value of* ***two*** *reporting cycles:*

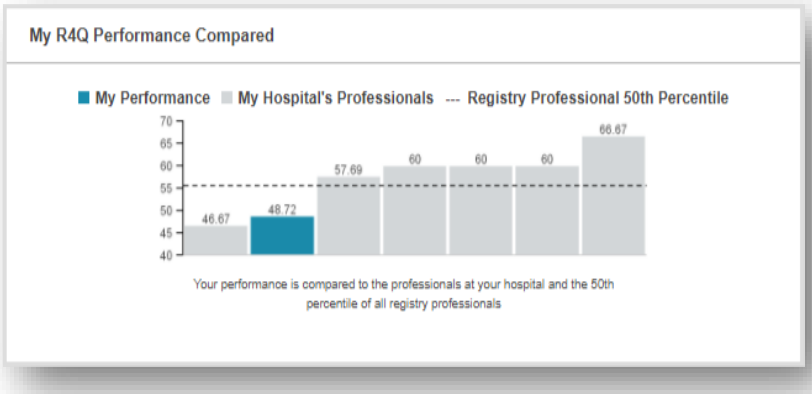
- *BLUE Text: the selected R4Q value*
- *GRAY Text: the prior R4Q value*



3. **Metric Details** link to review CV professional metric performance in greater detail.

My Performance Compared demonstrates CV professional performance against the other hospital professionals.

My Historical Performance (not pictured) demonstrates a quarterly performance trend.



4. The Professional Level Dashboard functions similarly to the eReports Dashboard, please locate the **v5 Dashboard User Guide** if additional navigational help is needed.

Understanding a Bullet Graph

CV professional metric performance for the R4Q is plotted in a bullet graph. The **dark blue line** denotes the provider's performance and will end where their R4Q metric value appears in relation to all CathPCI Registry CV Professionals. Performance is displayed against a scale that is arranged in **ascending order**. In both Figure 1 and Figure 2 the **quantitative scale** (red bracket) below the colored graph, goes from least to greatest. The colors of the bullet graph demonstrate performance from least desirable (pale blue) to most desirable (dark green). These are arranged left to right, ***or*** right to left as determined by the metric orientation. In both instances the ***dark blue line*** demonstrating individual performance should be the focus of attention.

Figure 1

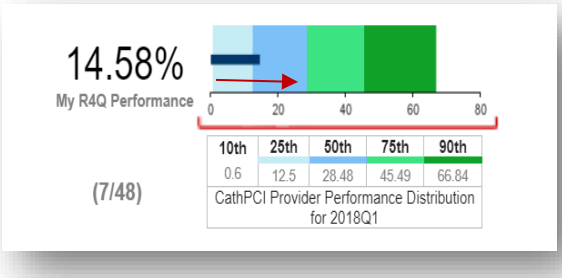


Figure 2

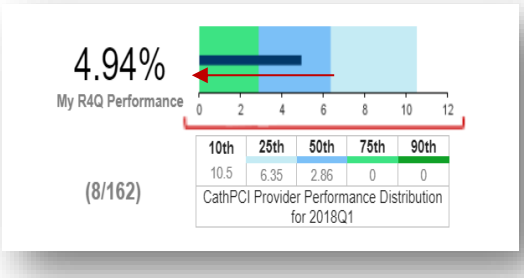
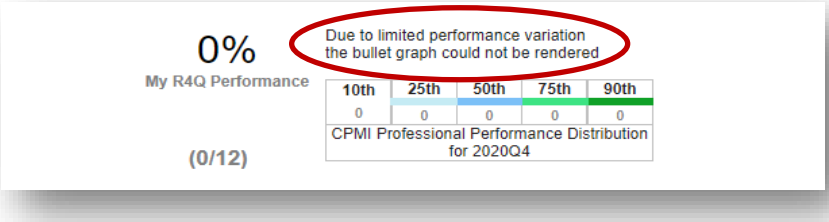


Figure 1 – Metric key 4821 Patients WITHOUT ACS that were of uncertain appropriateness, is oriented to a "positive" outcome. Desirable performance will have a ***higher*** percentage; thus, desirable performance (dark green) corresponds with the ascending numbers on the quantitative scale and appears to the right. Provider performance (where the dark blue line ends) of 14.58%% falls within the 50th percentile (medium blue).

Figure 2 – Metric key 4825 Proportion of PCI procedures not classifiable for AUC is oriented to a "negative" outcome. Desirable performance has a ***lower*** percentage; thus, desirable performance (dark green) *does not* correspond with the ascending numbers on the quantitative scale but is on the left, aligned with the lower numbers signifying better performance. Provider performance feels incongruous with the graph display; however, performance (where the dark blue line ends) of 4.94% falls within the 50th percentile (medium blue).

> ***Note:*** *The professional level dashboard compares an individual's metric result to the benchmark, which is determined from the metric performance of all cardiovascular professionals captured in the registry. Likewise, the eReports dashboard compares a facility's metric result to the benchmark, which is determined from the metric performance of all facilities in the registry. There are fewer facilities in the registry than CV Professionals and they have much higher patient/procedure volumes. As a result, the metric benchmarks are unique for each dashboard. Individual provider performance should* ***not*** *be compared to facility performance and/or facility benchmarks.*

Note: *Not all metrics can return a bullet graph:*



Frequently Asked Questions

1) What process is used to obtain NCDR data?

NCDR registries have been created under the leadership of clinical experts with critical input from NCDR participants regarding the feasibility of implementation and the burden of data collection. Data are collected, validated, and submitted under the responsibility of a designated Registry Site Manager (RSM) at each participating institution.

All data submissions are evaluated for errors and completeness and sent to the participant as a Data Quality Report (DQR). This automated process is based on a set of algorithms with predetermined thresholds to rate the submission using a color code: red, yellow and green.

Red means that the data submission has failed and will not be entered into the NCDR data warehouse and will not be included in the report.
Yellow means that the data has passed the threshold for errors but not completeness. The data will be entered into the NCDR data warehouse but will not be incorporated into the comparison reports.
Green means that the data passed both assessments, will be entered into the NCDR data warehouse, and will be included into any data computations and aggregated reports. Therefore, the DQR is used by NCDR participants to help prioritize data "cleaning" efforts.

2) What if the CV professional practices at more than one hospital?

The CV professional's National Provider Identifier (NPI) is the linked to the clinical data entered at each CathPCI Registry participating facility. The facility eReports Dashboard will only show the CV professional's data for that one entity. However, the provider can log into the acc.org NCDR Professional Level Dashboard to view the data for each hospital at one time or consolidate the data into one cumulative report.

3) Who has access to the CV professional's data?

CathPCI Registry Users with specific privileges to the Professional dashboard have access at the hospital level. The Registry Site Manager (RSM) has the ability to grant permission for the Professional Level Dashboard to other users at their hospital.

4) How is Professional Level Dashboard access granted to others?

The Registry Site Manager (RSM) will log in, navigate to the CathPCI Registry homepage and select Administration from the left navigation bar, then selection Site User Administration and locate the users name clicking on 'Edit'. Once on the User Setup page, scroll down to 'Privileges' and given access by checking the box by 'Professional Level Dashboard – Access all Provider Reports for your facility'

Note: *Persons having access to the PLD will be able to see the dashboards for all CV professionals participating in CathPCI Registry at that hospital.*

5) Do the CV professionals at my hospital have access to their data?

CV professionals who are members of the ACC can access their individual data on the ACC website http://www.acc.org/ their dashboards look similar to the NCDR PLD dashboard views, but they can also access data from any other CathPCI Registry participating hospital(s) in which they perform procedures. From the ACC website a provider can view each hospital report separately or a cumulative report of all their data. A Professional Level Dashboard User guide is available for providers from the Resource page.

6) Are the Professional Level Dashboard metrics publicly reported?

No, this data is not publicly reported.

7) Does the Professional Level Dashboard contain all cases?

All the cases that meet the specific Inclusion/Exclusion criteria for each measure will be included if:

a. The procedure occurred at a hospital that participates in the CathPCI Registry
b. The hospital submits all diagnostic and/or PCI procedures data that have passed the inclusion criteria (DQR is green or yellow) to be included in the data registry
c. Submitted data obtain a Green or Yellow Inclusion status on the (see FAQ #1)
d. The hospital has correctly identified the CV professional by his/her NPI number.

8) Why are the numerator/denominator counts of a facility metric not always equal to the sum total of the numerator/denominator counts from the PLD?

The facility metric evaluates patients/procedures once, while the PLD may provide feedback on a patient/procedure multiple times if multiple CV professionals were involved in care or various CV professionals are eligible for feedback (see metric criteria).
Example: Metric 2 PCI procedure with a positive stress or imaging study
Facility result: numerator 40/45 denominator – each procedure is evaluated once.
PLD: Sum of all CV professional Metric 2 data: numerator 41/46 denominator – the CV professional who performed the diagnostic study as well as all CV professionals who performed PCI on the patient will receive feedback. In this case, a patient had a diagnostic study by Provider #1 and elective PCI by Provider #2 and each Provider will receive feedback on this patient in Metric 2.

9) What if the PLD does not contain data or all cases?

Validate that the CV professional name and NPI number are a valid match with the CMS listing. Visit the Professional Remediation tab and the Valid Match page. Validate that the Provider has performed procedures during the selected timeframe and that the valid operator's name/NPI number is associated with these procedures. Review the metric inclusion/exclusion criteria to determine if the provider has cases that meet the criteria and would appear on the Professional Level Dashboard. If you cannot resolve the data discrepancy, then contact the NCDR at ncdr@acc.org or 1-800-257-4737.

Metric Specifications Explained

Numerator: Count of patients/procedures who meet the processes or outcomes expected for each patient, procedure, or other unit of measurement defined (e.g., PCI patients who received aspirin at discharge).

Denominator: Count of patients/procedures who remain after denominator exceptions/exclusions are applied to the eligible metric population.

Denominator Exclusions: Patients/procedures that are removed from the eligible metric population (e.g., PCI patients who received comfort measures only and are therefore not required to receive aspirin at discharge).

Denominator Exceptions: Patients/procedures that have not met the metric numerator criteria and have acceptable rationale such as a medical reason or patient reason are removed from the eligible metric population. (e.g., PCI patients with a medical reason for not receiving aspirin at discharge). In this way, the metric is only considering "eligible" patients/procedures.

Median: The median is the 50^{th} percentile (e.g. middle value for a set of data that was arranged in order of magnitude). It is less affected by outliers and skewed data.

Median population: Patients/procedures who remain after population exceptions/exclusions are applied to the eligible metric population.

CV professional Reporting: The documented CV professional (e.g., PCI Operator, Discharge, etc.) for which the metric will be reported.

Clinical Rationale/Guideline Recommendation: Executive summary metrics are selected based on supporting evidence, guideline recommendations or expert consensus. References to supporting documents (e.g., ACC/AHA Task Force citations) are provided for metrics as applicable.

Risk Adjusted: Indicates the measure is based on a non-hierarchical risk model, which only includes patient-level risk factors.

Risk Standardized: Indicates the measure is based on a hierarchical risk model, which includes both facility-level and patient-level risk factors.

Professional Level Dashboard Metric Reporting

V5 Metrics	Admitting	Attending	Diagnostic Cath Operator	PCI Operator Index	All PCI Operators	Discharging
Patient Volumes						
Patient volume	X	X	X		X	
Pts treated as admitting, attending, or discharge	X	X				X
Pts treated with Dx coronary angiography (only)			X			
Pts treated with PCI (with or without dx coronary angio)					X	
Pts treated with Dx coronary angio and PCI in same lab visit			X		X	
Pts treated with Dx coronary angio and PCI in subsequent lab visit			X		X	
Procedures Performed						
Total procedures			X		X	
Dx coronary angiography			X			
PCI (with or without dx coronary angio)					X	
Dx coronary angio and PCI in same lab visit			X		X	
PCI Procedures for ACS						
NSTE-ACS					X	
STEMI					X	
DxCath Procedure Indications						
ACS <=24hrs or ACS >24hrs			X			
Non-ACS			X			
Procedure Access Site						
Femoral			X		X	
Brachial			X		X	
Radial			X		X	
Other			X		X	
PCI Performance Measures						
Composite: Guideline medications prescribed at discharge					X	X
Quality Metrics						
PCI procedures with positive stress or imaging study			X		X	
Median time to immediate PCI (STEMI)					X	
PCI within 90 minutes (STEMI)					X	
Median time to PCI for in-house STEMI					X	
Pre and Post-procedure creatinine			X		X	
Aspirin prescribed at discharge					X	X

V5 Metrics	Admitting	Attending	Diagnostic Cath Operator	PCI Operator Index	All PCI Operators	Discharging
Statin prescribed at discharge					X	X
P2Y12 prescribed at discharge					X	X
ACE-I or ARB prescribed at discharge			X		X	X
Cardiac rehabilitation referral			X		X	X
Outcome Metrics						
Access site injury or major bleeding (Dx coronary angio procedures)			X			
Emergency/Salvage CABG post PCI					X	
Intra/post-procedure stroke			X		X	
Composite: Major adverse events (all PCI patients)				X		
Composite: Major adverse events (select patients)				X		
Efficiency Metrics						
Median post-procedure length of stay for (pts with STEMI)	X				X	X
Median post-procedure length of stay (pts w/ uncomplicated STEMI)	X				X	X
PCI in-hospital risk adjusted mortality					X	
PCI in-hospital risk standardized bleeding				X		
PCI in-hospital risk adjusted acute kidney injury				X		
Appropriate Use Criteria						
PCI procedures not classifiable for AUC reporting (all patient presentations)					X	
PCI procedures evaluated as appropriate (pts w/ ACS)					X	
PCI procedures evaluated as may be appropriate (pts w/ ACS)					X	
PCI procedures evaluated as rarely appropriate (pts w/ ACS)					X	
PCI procedure evaluated as appropriate (pts w/ SIHD)					X	
PCI procedure evaluated as may be appropriate (pts w/ SIHD)					X	
PCI procedure evaluated as rarely appropriate (pts w/ SIHD)					X	

Patient and Procedure Volume Information v5

Reported 2019Q1 to present

Patient Volume Data **Description:** Count of patients having the following treatment strategies where the CV professional was involved in care as either the attending, admitting, discharging, diagnostic operator and/or PCI operator respectively	
Total Patient Volume	Count of patients where the CV professional was involved in care as either the attending, admitting, discharging, diagnostic operator and/or PCI operator
Patients treated with Dx coronary angiography (only)	Count of patients having a Diagnostic Coronary Angiography (7045)(only) procedure during the cath lab visit
Patients treated with PCI (with or without Dx coronary angiography)	Count of patients having a PCI (7050) with or without a diagnostic coronary angiography (7045) during the cath lab visit
Patients treated with both Dx coronary angiography and PCI in same lab visit	Count of patients having diagnostic coronary angiography (7045) and PCI (7050) during the same lab visit
Patients treated with Dx coronary angiography and PCI in subsequent lab visit	Count of patients having a diagnostic coronary angiography (only) procedure (7045) and a PCI (7050) procedure in a subsequent lab visit
Time Period	Rolling 4 Quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Admitting (3053) • Attending (3058) • Diagnostic Cath Operator (7049) • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	According to the ACCF/AHA/SCAI 2013 Update of the Clinical Competence Statement on Coronary Artery Interventional Procedures the following are recommendations for CV professional competence; • Participate in PCI quality programs of the hospital, including review of major complications. • Participate in a hospital-based state, regional, or national database to measure risk-adjusted PCI outcomes of the laboratory and compare them to regional and national benchmarks for improving quality of care. • Based on available data and the judgment of the writing committee involving all of these considerations, the writing committee recommends interventional cardiologists perform a minimum of 50 coronary interventional procedures per year (averaged over a 2-year period) to maintain competency.
Relevant Citations	1. Harold HG, Bass TA, Bashore TM, et. al. ACCF/AHA/SCAI 2013 Update of the Clinical Competence Statement on Coronary Artery Interventional Procedures. J Am Coll Cardiol. 2017;62:357-96.

Procedure Volume Data **Description:** Count of the procedure type performed by the operator	
Dx coronary angiography	All instances where the CV professional was identified as the diagnostic coronary angiography operator (7045)
PCI (with or without dx coronary angiography)	Count of PCI procedures (7050) performed with or without a diagnostic coronary angiography (7045)
Dx coronary angiography and PCI in same lab visit	Count of procedures with diagnostic coronary angiography (7045) and PCI (7050) performed during the same lab visit
Time Period	Rolling 4 Quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054)
Clinical Rationale/ Recommendation	According to the ACCF/AHA/SCAI 2013 Update of the Clinical Competence Statement on Coronary Artery Interventional Procedures the following are recommendations for CV professional competence; • Participate in PCI quality programs of the hospital, including review of major complications. • Participate in a hospital-based state, regional, or national database to measure risk-adjusted PCI outcomes of the laboratory and compare them to regional and national benchmarks for improving quality of care. • Based on available data and the judgment of the writing committee involving all of these considerations, the writing committee recommends interventional cardiologists perform a minimum of 50 coronary interventional procedures per year (averaged over a 2-year period) to maintain competency.
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PCI Procedures for Acute Coronary Syndromes (ACS) **Description:** Distribution of PCI procedures performed by diagnosis of NSTE-ACS and STEMI	
NSTE-ACS PCI	PCI procedures for NSTE-ACS (7825)
STEMI PCI	PCI procedures for any STEMI PCI Indication (7825) • STEMI – Immediate PCI for Acute STEMI • STEMI – Stable (<= 12 hrs from Sx) • STEMI – Stable (> 12 hrs from Sx) • STEMI – Unstable (> 12 hrs from Sx) • STEMI (after successful lytics) • STEMI – Rescue (after unsuccessful lytics)
Time Period	Rolling 4 Quarters
CV Professional Reporting	PCI Operator (7054)
Clinical Rationale/ Recommendation	Acute myocardial infarction is a frequent cause for hospital admission and is associated with significant morbidity and mortality.
Relevant Citations	1. Jneid H, Addison D, Bhatt DL, et al. 2017 AHA/ACC clinical performance and quality measures for adults with ST-elevation and Non-ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures. J Am Coll Cardiol. 2017;70:2048-90.

Note: The total number of procedures performed for STEMI and NSTEMI-ACS PCI Indications ***may not*** match the denominator of the AUC metrics 31, 32 & 33 for patients with ACS.

Example: When a patient is stable after PCI for any STEMI indication and has a second, staged PCI, the PCI Indication will reflect this stable presentation; however, the staged procedure will be mapped to Table 1.3 of the 2016 AUC for coronary revascularization in patients with ACS. Therefore, the staged procedure will be included in the denominator of the AUC metrics for patients with ACS but ***will not*** *be counted in the volume metrics for PCI procedures for STEMI and NSTEMI-ACS.*

DxCath Procedure Indications **Description:** Distribution of diagnostic coronary angiography procedures for ACS and Non-ACS cath lab indications	
Dx coronary angiography for an ACS indication	Dx coronary angiography procedures where at least one indication identified ACS ACS cath lab indications (7400) include: • ACS <= 24 hrs • ACS > 24 hrs
Dx coronary angiography for Non – ACS indication	Dx coronary angiography procedures where all indication(s) were for non-ACS Non-ACS cath lab indications (7400) include: • New onset angina <= 2 months • Worsening angina • Resuscitated cardiac arrest • Stable known CAD • Suspected CAD • Valvular disease • Pericardial disease • Cardiac arrhythmia • Cardiomyopathy • LV Dysfunction • Syncope • Post cardiac transplant • Pre-operative evaluation • Evaluation for exercise clearance • Other
Time Period	Rolling 4 Quarters
CV Professional Reporting	Diagnostic Cath Operator (7049)

Procedure Access Site **Description:** Distribution of arterial access utilization	
Femoral	Procedures performed (7050) with femoral arterial access (7320)
Brachial	Procedures performed (7050) with brachial arterial access (7320)
Radial	Procedures performed (7050) with radial arterial access (7320)
Other	Procedures performed (7050) with an "other" arterial access (7320)
Time Period	Rolling 4 Quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054)
Clinical Rationale/ Recommendation	Bleeding complication after PCI are associated with increased morbidity, mortality, and costs. This measure is helpful in providing feedback on choice of arterial access site which my influence bleeding complications, clinical decision-making, and directing the use of bleeding avoidance strategies to improve the safety of PCI procedures.
Relevant Citations	1. Rao SV, Ou FS, Wang TY et al. Trends in the prevalence and outcomes of radial and femoral approaches to percutaneous coronary intervention: a report from the national cardiovascular data registry. JACC Cardiovasc Interv 2008;1:379-86. 2. Marso SP, Amin AP, House JA et al. Association between use of bleeding avoidance strategies and risk of periprocedural bleeding among patients undergoing percutaneous coronary intervention. JAMA 2010;303:2156-64. 3. Mehta SK, Frutkin AD, Lindsey JB et al. Bleeding in patients undergoing percutaneous coronary intervention: The development of a clinical risk algorithm from the National Cardiovascular Data Registry. Circulation: Cardiovascular Interventions 2009;2:222-229.

Specifications for Performance Measures v5

Composite: Guideline medications prescribed at discharge **Description:** Percentage of PCI patients who were prescribed all medications (aspirin, statin, and/or P2Y12 Inhibitor) for which they were eligible	
Numerator	• Patients with a stent placed who ***were prescribed**** aspirin, statin and a P2Y12 inhibitor (10205) at discharge, ***or***; • Patients without a stent placed who ***were prescribed**** aspirin and statin (10205) at discharge *Patients with a medical or patient reason for not prescribing a medication will still meet the numerator **IF** they were prescribed all other medication(s) for which they were eligible. *If an anticoagulant (Warfarin, Apixaban, Dabigatran, Edoxaban *or* Rivroxaban) ***and*** a P2Y12 inhibitor (Clopidogrel, Prasugrel, Ticagrelor *or* Ticlopidine) are prescribed at discharge the aspirin requirement is met.
Denominator	Patients with PCI (7050)
Denominator Exclusions	Patients with ***any*** of the following: • Comfort measures only (10075) • Death during hospitalization (10105) • Left against medical advice (10110) • Discharge to another acute care hospital (10110) • Discharge to hospice care (10115)
Denominator Exceptions	Medical and/or patient reason for not prescribing aspirin **AND** statin **AND** ***all*** P2Y12 inhibitors (10205) at discharge
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054)
Clinical Rationale/ Recommendation	See individual metrics
Relevant Citations	See individual metrics This measure has been endorsed by the National Quality Forum. Measure #0964

Specifications for Quality Measures v5

Metrics that support self-assessment and quality improvement at the CV professional, hospital, and/or health care system level.

Process Metrics

PCI procedures with positive stress or imaging study **Description:** Percentage of elective PCI procedures for stable patients with a prior positive stress or imaging study or FFR ratio or iFR ratio	
Numerator	Elective PCI procedures (7800) with a positive stress performed within 6 months of procedure ***or*** imaging study performed within 6 months of procedure (5201, 5202, 5204) ***or*** a fractional flow reserve (FFR) ratio of <=0.8 (7512) ***or*** an instantaneous wave-free ratio (iFR) of <= 0.89 (7513) (*any novel non-hyperemic value reported in the iFR field will be considered)
Denominator	PCI procedures (with/without dx coronary angiography)
Denominator Exclusions	Procedures with ***any*** of the following: • Cath Lab visit indication of post cardiac transplant (7400) • Cath Lab visit indication of Pre-operative evaluation (7400) and Solid organ transplant surgery = yes (7469) • Severe Aortic Stenosis (7450, 7451) • Staged PCI (7821) • PCI status of urgent, emergency or salvage (7800) • PCI indication of STEMI (7825) • PCI indication of new onset angina <= 2 months (7825) • PCI indication of NSTE-ACS (7825)
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054)
Clinical Rationale/ Recommendation	In situations where angiography reveals coronary narrowing with questionable hemodynamics, the use of invasive measurements such as fractional flow reserve (FFR) may be useful in determining the need for revascularization. An FFR of <= 0.80 is abnormal and consistent with downstream inducible ischemia. (1) The 2017 appropriateness criteria for stable ischemic heart disease utilizes objective measures of ischemia such as stress testing in order to stratify patients into low-risk or intermediate-/high-risk findings along with intracoronary physiological testing in order to inform clinicians as to the reasonable utilization of procedures to improve symptoms and health outcomes. (2)
Relevant Citations	1. Levine GN, Bates ER, Blakenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ ASNC/SCAI/SCCT/STS 2017 Appropriate use criteria for coronary revascularization in patients with stable ischemic heart disease. J Am Coll Cardiol. 2017;69:2212-41.

Median time to immediate PCI (procedures with STEMI) **Description:** Median time (in minutes) from arrival (or subsequent ECG) to first device activation time of PCI procedures for STEMI procedures	
Median	Median time from arrival date/time (3001) ***or*** subsequent ECG date/time (7936) ***to*** first device activation date/time (7845)
Population	PCI procedures (with/without dx coronary angiography) (7050) with an indication of immediate PCI for acute STEMI (7825)
Population Exclusions	Transferred in for immediate PCI for STEMI (7841)
Population Exceptions	Patient centered reason for delay in PCI (7850) ***and*** a time to first device activation time of > 90 minutes (7845, 3001)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Primary PCI is the recommended triage strategy for patients with STEMI with the system goal of first-medical-contact to device time of 90 minutes or less. (ACC/AHA Recommendation Class I, Level of Evidence: B). Early successful PCI greatly decreases the complications of STEMI that result from longer ischemic times or unsuccessful fibrinolytic therapy, allowing earlier hospital discharge and resumption of daily activities.
Relevant Citations	1. O'Gara PT, Kushner FG, Ascheim DD, et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;61:e78-140.

PCI within 90 minutes (patients with STEMI) **Description:** Percentage of PCI procedures for STEMI with a time from arrival (or subsequent ECG) to first device activation time of ≤90 minutes	
Numerator	STEMI PCI procedures (7825) with arrival date/time (3001) ***or*** subsequent ECG date/time (7936) ***to*** first device activation date/time of ≤ 90 minutes (7845)
Denominator	PCI procedures (with/without dx coronary angiography) (7050) with an indication of immediate PCI for acute STEMI (7825)
Denominator Exclusions	Transferred in for immediate PCI for STEMI (7841)
Denominator Exceptions	Patient centered reason for delay in PCI (7850) ***and*** a time to first device activation time of > 90 minutes (7845, 3001)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Primary PCI is the recommended triage strategy for patients with STEMI with the system goal of first-medical-contact to device time of 90 minutes or less. (ACC/AHA Recommendation Class I, Level of Evidence: B). Early successful PCI greatly decreases the complications of STEMI that result from longer ischemic times or unsuccessful fibrinolytic therapy, allowing earlier hospital discharge and resumption of daily activities.
Relevant Citations	1. O'Gara PT, Kushner FG, Ascheim DD, et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;61:e78-140.

Median time to PCI for in-house STEMI **Description:** Median time (in minutes) from STEMI diagnosis to treatment with PCI	
Median	Median time from subsequent ECG with STEMI ***or*** equivalent date/time (7836) ***to*** first device activation date/time (7845)
Population	PCI procedures (with/without dx coronary angiography) (7050) with an indication of immediate PCI for acute STEMI (7825) ***and*** STEMI ***or*** equivalent noted on subsequent ECG (7835)
Population Exclusions	• Transferred in for immediate PCI for STEMI (7841), ***or,*** • Subsequent ECG obtained in the emergency department (7840)
Population Exceptions	Patient centered reason for delay in PCI (7850) ***and*** a time to first activation date/time of > 90 minutes (7845, 7836)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Treatment of patients with in-hospital STEMI is more complex and challenging than treatment of patients who develop out-of-hospital STEMI, leading to delays in diagnosis and triage and less frequent use of reperfusion therapy. Three areas of delay in the treatment of patients who develop in-hospital STEMI that warrant particular attention are: delays in ECG acquisition, delays in ECG interpretation, and delays in activating existing STEMI systems of care.
Relevant Citations	1. Levine GN, Dai X, Henry TD, et al. In-hospital ST-segment elevation myocardial infarction: improving diagnosis, triage, and treatment. JAMA Cardiol. 2018;3:527 - 531.

Pre and post-procedure creatinine **Description:** Percentage of PCI procedures with both pre and post-procedure creatinine obtained	
Numerator	Procedures with creatinine assessed pre-procedure (6050) ***and*** post-procedure (8510) ***or*** at discharge (10060)
Denominator	PCI procedures (with/without dx coronary angiography) (7050)
Denominator Exclusions	• Death during the procedure (10120), ***or,*** • Post-procedure length of stay < =24 hours (10101, 7005)
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054)
Clinical Rationale/ Recommendation	Patients should be assessed for risk of contrast-induced acute kidney injury (AKI) before PCI. (ACCF/AHA/SCAI Recommendation Class I, Level of Evidence: C). (1) Acute kidney injury (AKI) is a potential complication of PCI that in some cases progresses to the need for hemodialysis. Post PCI acute kidney injury is associated with an increased risk of bleeding, myocardial infarction and death. If the injury progresses to the need for dialysis these risks significantly increase. (2)
Relevant Citations	1. Levine GN, Bates ER, Blakenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122. 2. Tsai, TT, Patel, UD, Chang, TI, et al. Contemporary incidence, predictors, and outcomes of acute kidney injury in patients undergoing percutaneous coronary interventions: insights from the NCDR Cath-PCI Registry. J Am Coll Cardiol Cardiovascular Interventions. 2014;7:1-9.

Aspirin prescribed at discharge **Description:** Percentage of PCI patients who were prescribed aspirin at discharge	
Numerator	Patients who were prescribed aspirin (10205) at discharge
Denominator	Patients with PCI (7050)
Denominator Exclusions	Patients with ***any*** of the following: • Comfort measures only (10075) • Death during hospitalization (10105) • Left against medical advice (10110) • Discharge to another acute care facility (10110) • Discharge to hospice (10115)
Denominator Exceptions	• Medical or patient reason for not prescribing aspirin (10205) at discharge, ***or***; • An anticoagulant (Warfarin, Apixaban, Dabigatran, Edoxaban *or* Rivroxaban) ***and*** a P2Y12 inhibitor (Clopidogrel, Prasugrel, Ticagrelor *or* Ticlopidine) (10205) are prescribed at discharge
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • PCI Operator (7054) • Discharge CV professional (10073)
Clinical Rationale/ Recommendation	After PCI, aspirin should be continued indefinitely. (ACCF/AHA/SCAI Recommendation Class I, Level of Evidence A). (1)
Relevant Citations	1. Levine GN, Bates ER, Blakenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122. 2. Levine GN, Bates ER, Bittl JA, et al. 2016 ACC/AHA Guideline focused update on duration of dual antiplatelet therapy in patients with coronary artery disease. J Am Coll Cardiol. 2016;61:1082-115.

Statin prescribed at discharge **Description:** Percentage of PCI patients who were prescribed a statin at discharge	
Numerator	Patients who were prescribed a statin (10200) at discharge
Denominator	Patients with PCI (7050)
Denominator Exclusions	Patients with ***any*** of the following: • Comfort measures only (10075) • Death during hospitalization (10105) • Left against medical advice (10110) • Discharge to another acute care facility (10110) • Discharge to hospice (10115)
Denominator Exceptions	Medical or patient reason for not prescribing a statin (10205) at discharge
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	Statin therapy has been shown to reduce all-cause mortality and cardiovascular events including recurrent myocardial infarction and coronary revascularization as well as delay coronary atherosclerosis progression. (1) High-intensity statin therapy should be initiated or continued as first-line therapy in women and men <= 75 years of age who have clinical atherosclerotic cardiovascular disease, unless contraindicated. (ACC/AHA Recommendation Class I, Level of Evidence A). (2) If treatment with a high-intensity statin is contraindicated a moderate intensity statin should be used if tolerated. (ACC/AHA Recommendation Class I, Level of Evidence A). (2)
Relevant Citations	1. Jneid H, Addison D, Bhatt DL, et al. 2017 AHA/ACC clinical performance and quality measures for adults with ST-elevation and Non-ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures. J Am Coll Cardiol. 2017;70:2048-90. 2. Stone NJ, Robinson JG, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 2014;63:2889-934.

P2Y12 inhibitor prescribed at discharge **Description:** Percentage of PCI patients with a stent implanted who were prescribed a P2Y12 inhibitor at discharge	
Numerator	Patients who were prescribed a P2Y12 inhibitor (10205) at discharge
Denominator	Patients with PCI (7050) ***and*** stent implantation (8028)
Denominator Exclusions	Patients with ***any*** of the following: • Comfort measures only (10075) • Death during hospitalization (10105) • Left against medical advice (10110) • Discharge to another acute care facility (10110) • Discharge to hospice (10115)
Denominator Exceptions	Medical and/or patient reason for not prescribing ***all*** P2Y12 inhibitors (10205) at discharge
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	Recommendations for the duration of dual antiplatelet therapy (DAPT) in patients with symptomatic ischemic heart disease (SIHD) who are treated with PCI include: a. In patients with SIHD treated with DAPT after bare metal stent (BMS) implantation, P2Y12 inhibitor therapy should be given for a minimum of 1 month. (ACC/AHA Recommendation Class I, Level of Evidence: A). b. In patients with SIHD treated with DAPT after drug eluting stent (DES) implantation, P2Y12 inhibitor therapy should be given for at least 6 months. (ACC/AHA Recommendation Class I, Level of Evidence: B). Recommendations for the duration of dual antiplatelet therapy in patients with Acute Coronary Syndrome (ACS) who are treated with PCI include: a. In patients with ACS treated with DAPT after BMS or DES implantation, P2Y12 inhibitor therapy should be given for at least 12 months. (ACC/AHA Recommendation Class I, Level of Evidence: B).
Relevant Citations	1. Levine GN, Bates ER, Bittl JA, et al. 2016 ACC/AHA Guideline focused update on duration of dual antiplatelet therapy in patients with coronary artery disease. J Am Coll Cardiol. 2016;61:1082-115.

ACE-I or ARB prescribed at discharge **Description:** Percentage of patients with a left ventricular ejection fraction (LVEF) < 40% who were prescribed an ACE inhibitor or ARB at discharge	
Numerator	Patients who were prescribed an ACE inhibitor ***or*** ARB (10200) at discharge
Denominator	PCI patients (7050) with a LVEF < 40% (7061) (or if not obtained 5116)
Denominator Exclusions	Patients with ***any*** of the following: • Comfort measures only (10075) • Death during hospitalization (10105) • Left against medical advice (10110) • Discharge to another acute care facility (10110) • Discharge to hospice (10115)
Denominator Exceptions	Medical or patient reason for not prescribing both an ACE inhibitor ***and*** an ARB (10205) at discharge
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	ACE inhibitors or ARBs are recommended in patients with heart failure reduced ejection fraction (HFrEF) and current or prior symptoms, uncles contraindicated, to reduce morbidity and mortality (Class I, Level of Evidence: A).
Relevant Citations	1. Yancy CW, Jessup M, Bozkurt B, et al. 2017 ACC/AHA/HFSA Focused update of the 2013 ACCF/AHA guideline for the management of heart failure: A report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and Heart Failure Society of America. J Am Coll Cardiol. 2017;70:776-803.

Cardiac rehabilitation referral **Description:** Percentage of patients who received a cardiac rehabilitation referral after PCI	
Numerator	Patients with a cardiac rehabilitation referral (10116)
Denominator	PCI patients (7050)
Denominator Exclusions	Patients with ***any*** of the following: • Comfort measures only (10075) • Death during hospitalization (10105) • Left against medical advice (10110) • Discharge to another acute care facility (10110) • Discharge to hospice (10115)
Denominator Exceptions	Medical or health care system reason (10116) for not providing a cardiac rehabilitation referral
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	Medically supervised exercise programs (cardiac rehabilitation) should be recommended to patients after PCI, particularly for moderate – to high-risk patients for whom supervised exercise training is warranted. (ACCF/AHA/SCAI Recommendation Class I, Level of Evidence: A). (1) Participation in a cardiac rehabilitation program is associated with a reduction in all- cause mortality and recurrent myocardial infarction. Participants can also experience improved exercise tolerance, decreased cardiac symptoms, improved lipid levels, decreased stress, improved compliance with medical treatments/medications and improved feelings of well-being. (1)
Relevant Citations	1. Levine GN, Bates ER, Blakenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122. 2. Jneid H, Addison D, Bhatt DL, et al. 2017 AHA/ACC clinical performance and quality measures for adults with ST-elevation and Non-ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures. J Am Coll Cardiol. 2017;70:2048-90. 3. Thomas RJ, Balady G, Banka G, et al. 2018 ACC/AHA clinical performance and quality measures for cardiac rehabilitation: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures: J Am Coll Cardiol. 2018.

Outcome Metrics

Access site injury or major bleeding among diagnostic angiography procedures **Description:** Percentage of diagnostic coronary angiography procedures with access site injury or major bleeding	
Numerator	Procedures with ***any one*** of the following • Bleeding at access site (9001) • Hematoma at access site (9001) • Retroperitoneal bleeding (9001) • Other vascular complications requiring treatment (9001)
Denominator	Diagnostic coronary angiography procedures (No PCI) (7045)
Denominator Exclusions	PCI procedure during the same Episode of Care (7050) ***OR*** Diagnostic coronary angiography procedures with ***any*** of the following concomitant procedures during the same cath lab visit (7066): • LAAO • Mitral Clip • Peripheral intervention • Structural repair • TAVR • EP study ***OR*** Patients with ***any*** of the following interventions during the hospitalization (10031): • CABG • Cardiac surgery (non-CABG) • Surgery (non-cardiac) • Valvular intervention • Structural Heart intervention (non-valvular) • EP study
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	Diagnostic Cath Operator(s) (7049)
Clinical Rationale /Recommendation	Vascular complications can cause significant discomfort and disability for patients. While rates of complications will be sensitive to patient characteristics, there is evidence that hospitals can significantly influence overall complication rates. This can be accomplished through monitoring and analyzing the cause of complications, developing policies and procedures that minimize the risk of complications and developing policies that assure operation and cath team competency.
Relevant Citations	1. Mehran R, Rao SV, Bhatt DL, et al. Standardized bleeding definitions for cardiovascular clinical trials: a consensus report form the Bleeding Academic Research Consortium. Circulation. 2011;123:2736-2747.

Emergency/Salvage CABG post PCI **Description:** Percentage of PCI patients who had emergency or salvage CABG post-procedure	
Numerator	Patients having emergency ***or*** salvage CABG (10035) after a PCI procedure
Denominator	Patients with PCI (7050)
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Emergency CABG following PCI is a major adverse event which is associated with increased rates of in-hospital mortality and morbidity. The indications for emergency CABG after PCI are most often related to acute or threatened vessel closure, dissection, perforation, failure to cross the lesion or equipment malfunction such as stent dislodgement or fractured guidewire. Emergency CABG is recommended after failed PCI in the presence of ongoing ischemia or threatened occlusion with substantial myocardium at risk. (ACCF/AHA Recommendation Class I, Level of Evidence: B).
Relevant Citations	1. Hills LD, Smith PK, Anderson JL, et al. 2011 ACCF/AHA guideline for coronary artery bypass surgery: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2011;58:e123-310.

Intra/post-procedure stroke **Description:** Percentage of PCI procedures with intra/post-procedure stroke	
Numerator	PCI procedures with an intra/post-procedure ischemic; hemorrhagic ***or*** undetermined stroke (9001)
Denominator	PCI procedures (with/without dx coronary angiography) (7050)
Denominator Exclusions	PCI procedures with ***any*** of the following concomitant procedures during the same cath lab visit (7066): • LAAO • Mitral Clip • Peripheral intervention • Structural repair • TAVR • EP study ***OR*** Patients with ***any*** of the following interventions during the hospitalization (10031): • CABG • Cardiac surgery (non-CABG) • Surgery (non-cardiac) • Valvular intervention • Structural Heart intervention (non-valvular) • EP study ***OR*** Patients discharged to another acute care hospital (10110)
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Diagnostic Cath Operator (7049) • PCI Operator (7054)
Clinical Rationale/ Recommendation	Factors associated with an increased risk of stroke include: administration of thrombolytics prior to PCI, cerebrovascular disease, the indication for PCI of STEMI, utilization of an IABP, advanced age and female sex. (1) Stroke is one of the major complications that can occur during or after a PCI procedure. Patients who experience a post PCI stroke have increased rates of in-hospital mortality and morbidity. (2)
Relevant Citations	1. Levine GN, Bates ER, Blakenship JC, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol. 2011;58:e44-122. 2. Myint PK, Kwok CS, Roffe C, et al. Determinants and outcomes of stroke following percutaneous coronary intervention by indication. Stroke. 2016;47:1500-1507.

Composite: Major adverse events (all PCI patients) **Description:** Percentage of patients who experienced a major adverse event associated with the PCI procedure	
Numerator	Patients with ***<u>any one</u>*** of the following: • Discharge status of deceased (10105) • Emergency/salvage CABG (post PCI) (10035) • Stroke (hemorrhagic, ischemic, undetermined) (9001) • Emergency/salvage repeat target segment revascularization (7050, 7800, 8001) *Repeat target segment revascularization is defined as a repeat PCI procedure on the same segment during the same Episode of Care
Denominator	Patients with PCI (7050)
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	This metric represents a composite of major adverse events associated with the PCI procedure.

Composite: Major adverse events (select PCI patients) **Description:** Percentage of patients who experienced a major adverse event associated with the PCI procedure	
Numerator	Patients with ***any one*** of the following: • Discharge status of deceased (10105) • Emergency/salvage CABG (post PCI) (10035) • Stroke (hemorrhagic, ischemic, undetermined) (9001) • Emergency/salvage repeat target segment revascularization (7050, 7800, 8001) *Repeat target segment revascularization is defined as a repeat PCI procedure on the same segment during the same Episode of Care
Denominator	Patients with PCI (7050)
Denominator Exclusions	PCI procedures with ***any*** of the following concomitant procedures during the same cath lab visit (7066): • LAAO • Mitral Clip • Peripheral intervention • Structural repair • TAVR • EP study ***OR*** Patients with ***any*** of the following interventions during the hospitalization (10031): • Elective or urgent CABG • Cardiac surgery (non-CABG) • Surgery (non-cardiac) • Valvular intervention • Structural Heart intervention (non-valvular) • EP study
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	This metric represents a composite of major adverse events associated with the PCI procedure.

PCI in-hospital Observed Mortality (all patients) **Description:** Your PCI in-hospital observed mortality for patients with PCI using the NCDR® PCI risk adjusted mortality model	
Count	Count of eligible patients who had a PCI (7050) with a discharge status of deceased (10105) (Unadjusted or actual number of mortalities)
Exclusions	Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Expected Mortality (all patients) **Description:** Your PCI in-hospital expected mortality for patients with PCI using the NCDR® PCI risk adjusted mortality model	
Cumulative Sum	Cumulative sum of the predicted or expected probability of death of all eligible patients who had a PCI (7050) in the reporting timeframe (alive or deceased) based on the variables and coefficients in the NCDR® risk model (expressed as a decimal).
Exclusions	Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Observed/Expected Mortality Ratio (all patients) **Description:** Your PCI in-hospital observed to expected mortality ratio for patients with PCI using the NCDR® PCI risk adjusted mortality model	
Ratio	Ratio of Observed to Expected (O/E) mortalities for PCI patients Observed/Expected Mortality Ratio (O/E Ratio) – provides feedback on the comparison between the observed to expected. If the O/E ratio is > 1 then there were more deaths than expected. If the ratio is equal to 1 then there were the same number of deaths as expected. If the O/E ratio is < 1 then there were less deaths than expected.
Exclusions	Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Observed Mortality (patients with STEMI) **Description:** Your PCI in-hospital observed mortality for patients with PCI for STEMI using the NCDR® PCI risk adjusted mortality model	
Count	Count of eligible patients who had a PCI (7050) for STEMI (7825) with a discharge status of deceased (10105) (Unadjusted or actual number of mortalities)
Exclusions	Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Expected Mortality (patients with STEMI) **Description:** Your PCI in-hospital expected mortality for patients with PCI for STEMI using the NCDR® PCI risk adjusted mortality model	
Cumulative Sum	Cumulative sum of the predicted or expected probability of death of all eligible patients who had a PCI (7050) for STEMI (7825) in the reporting timeframe (alive or deceased) based on the variables and coefficients in the NCDR® risk model (expressed as a decimal).
Exclusions	Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Observed/Expected Mortality Ratio (patients with STEMI) Description: Your in-hospital observed to expected mortality ratio for patients with PCI for STEMI using the NCDR® PCI risk adjusted mortality model	
Ratio	Ratio of Observed to Expected (O/E) mortalities for patients who had a PCI (7050) for STEMI (7825) Observed/Expected Mortality Ratio (O/E Ratio) – provides feedback on the comparison between the observed to expected. If the O/E ratio is > 1 then there were more deaths than expected. If the ratio is equal to 1 then there were the same number of deaths as expected. If the O/E ratio is < 1 then there were less deaths than expected.
Exclusions	Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Observed Mortality (STEMI patients excluded) **Description:** Your in-hospital observed mortality for patients with PCI excluding those treated for STEMI using the NCDR® PCI risk adjusted mortality model	
Count	Count of eligible patients who had a PCI (7825) for an indication other than STEMI (7825) with a discharge status of deceased (10105) (Unadjusted or actual number of mortalities)
Exclusions	Patients with PCI indication of STEMI (7825); ***and*** Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Expected Mortality (STEMI patients excluded) **Description:** Your PCI in-hospital expected mortality for patients excluding those treated for STEMI using the NCDR® PCI risk adjusted mortality model	
Cumulative Sum	Cumulative sum of the predicted or expected probability of death of all eligible patients who had a PCI (7050) for an indication other than STEMI (7825) in the reporting timeframe (alive or deceased) based on the variables and coefficients in the NCDR® risk model (expressed as a decimal).
Exclusions	Patients with PCI indication of STEMI (7825); ***and*** Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Observed/Expected Mortality Ratio (STEMI patients excluded) Description: Your PCI in-hospital observed to expected mortality ratio for patients excluding those treated for STEMI using the NCDR® PCI risk adjusted mortality model	
Ratio	Ratio of Observed to Expected (O/E) mortalities for patients who had a PCI (7050) Observed/Expected Mortality Ratio (O/E Ratio) – provides feedback on the comparison between the observed to expected. If the O/E ratio is > 1 then there were more deaths than expected. If the ratio is equal to 1 then there were the same number of deaths as expected. If the O/E ratio is < 1 then there were less deaths than expected.
Exclusions	Patients with PCI indication of STEMI (7825); ***and*** Patients who transfer to "other acute care facility" on discharge (10110)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	Although death in patients with serious heart disease is not completely unexpected, the rate (adjusted for case mix/patient factors) is sensitive to a number of controllable factors such as case selection, procedural judgement and operator skill, as well as institutional support and overall quality of care. The NCDR® risk adjustment model analyzes multiple elements to account for patient risk factors that are present prior to PCI. Risk adjustment "levels the playing field" among participating institutions and adjusts the "actual" mortality rate based on these factors. In other words, if you have several very sick patients die, your risk adjusted mortality rate would be lower than your actual mortality rate. If you had several very healthy patients die unexpectedly, your risk adjusted mortality rate would be higher than your actual mortality rate. Please refer to the detail section of the report and the risk adjustment technical notes for more information.
Relevant Citations	1. Brennan JM, Curtis JP, Dai D, et al., on behalf of the National Cardiovascular Data Registry. Enhanced mortality risk prediction with a focus on high-risk percutaneous coronary intervention. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:790-799. 2. Peterson ED, Dai D, DeLong ER, et al., for the NCDR Registry Participants. Contemporary mortality risk prediction for percutaneous coronary intervention. J Am Coll Cardiol. 2010;55:1923-1932. This measure has been endorsed by the National Quality Forum. Measure #0133

PCI in-hospital Observed Bleeding events (all patients) **Description:** Your PCI in-hospital observed bleeding events for patients with PCI procedures using the NCDR® PCI risk adjusted bleeding model	
Counts	Count of occurrences of bleeding in eligible patients who had a PCI. A bleeding event is defined as ***any*** one of the following: • Bleeding event ((9001 = access site gastrointestinal, or genitourinary, or hematoma at access site, or retroperitoneal, or other and 9002 = yes) that occurred during the PCI procedure (7000, 7005) ***or*** 72 hours after the PCI (9003, 7005) • Hemorrhagic stroke (9001, 9002) • Tamponade (9001, 9002, 9003) • RBC Transfusion (9275) = yes for patients with a pre-procedure Hgb >8 g/dL (6030) ***and*** pre-procedure Hgb (6030) not missing • Absolute Hgb decrease (6030 and 8505) from pre-PCI to post-PCI of >= 4 g/dL for patients with either a pre-procedure Hgb <=16 g/dL (6030) ***or*** a mechanical support device was not used (7422) (Unadjusted or actual number of bleeding events)
Exclusions	Patients with ***any*** of the following: • Missing values for all the outcome variables of bleeding events (9001, 2002) or transfusion (9275) • Death within 24 hours of the Index PCI (10101, 7005, 10105) • CABG during the hospitalization (10031)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	Bleeding complications after PCI are associated with increased morbidity, mortality and costs. This measure is helpful in providing risk-adjusted feedback on bleeding complications, informing clinical decision-making, and directing the use of bleeding avoidance strategies to improve the safety of PCI procedures.
Relevant Citations	1. Rao SV, McCoy LA, Spertus JA, et al. An updated bleeding model to predict the risk of post-procedure bleeding among patients undergoing percutaneous coronary intervention: A report using an expanded bleeding definition from the National Cardiovascular Data Registry CathPCI Registry. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:897-904. This measure has been endorsed by the National Quality Forum. Measure #2459

PCI in-hospital Expected Bleeding events (all patients) **Description:** Your in-hospital expected bleeding events for patients with PCI procedures using the NCDR® PCI risk adjusted bleeding model	
Cumulative Sum	Cumulative sum of the predicted or expected probability of a bleeding event of all eligible patients who had a PCI (7050) in the reporting timeframe (alive or deceased) based on the variables and coefficients in the NCDR® risk model (expressed as a decimal).
Exclusions	Patients with ***any*** of the following: • Missing values for all the outcome variables of bleeding events (9001, 2002) or transfusion (9275) • Death within 24 hours of the Index PCI (10101, 7005, 10105) • CABG during the hospitalization (10031)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	Bleeding complications after PCI are associated with increased morbidity, mortality and costs. This measure is helpful in providing risk-adjusted feedback on bleeding complications, informing clinical decision-making, and directing the use of bleeding avoidance strategies to improve the safety of PCI procedures.
Relevant Citations	1. Rao SV, McCoy LA, Spertus JA, et al. An updated bleeding model to predict the risk of post-procedure bleeding among patients undergoing percutaneous coronary intervention: A report using an expanded bleeding definition from the National Cardiovascular Data Registry CathPCI Registry. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:897-904. This measure has been endorsed by the National Quality Forum. Measure #2459

PCI in-hospital Observed/Expected Bleeding Ratio (all patients) Description: Your PCI in-hospital observed to expected ratio of bleeding events for patients with PCI procedures using the NCDR® PCI risk adjusted bleeding model	
Ratio	Ratio of Observed to Expected (O/E) bleeding events for patients who had a PCI (7050) Observed/Expected Bleeding Ratio (O/E Ratio) – provides feedback on the comparison between the observed to expected. If the O/E ratio is > 1 then there were more deaths than expected. If the ratio is equal to 1 then there were the same number of deaths as expected. If the O/E ratio is < 1 then there were less deaths than expected.
Exclusions	Patients with ***any*** of the following: • Missing values for all the outcome variables of bleeding events (9001, 2002) or transfusion (9275) • Death within 24 hours of the Index PCI (10101, 7005, 10105) • CABG during the hospitalization (10031)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	Bleeding complications after PCI are associated with increased morbidity, mortality and costs. This measure is helpful in providing risk-adjusted feedback on bleeding complications, informing clinical decision-making, and directing the use of bleeding avoidance strategies to improve the safety of PCI procedures.
Relevant Citations	1. Rao SV, McCoy LA, Spertus JA, et al. An updated bleeding model to predict the risk of post-procedure bleeding among patients undergoing percutaneous coronary intervention: A report using an expanded bleeding definition from the National Cardiovascular Data Registry CathPCI Registry. J Am Coll Cardiol: Cardiovascular Interventions. 2013;6:897-904. This measure has been endorsed by the National Quality Forum. Measure #2459

PCI in-hospital Observed Acute Kidney Injury (all patients) **Description:** Your PCI in-hospital observed acute kidney injury events for patients with PCI procedures using the NCDR® PCI risk adjusted AKI model	
Count	Count of occurrences of acute kidney injury in eligible patients who had a PCI (7050) Acute kidney injury is defined as ***any*** one of the following: • Increase in serum creatinine of ≥ 0.3 mg/dL from baseline (6050 and 8510) • Increase in serum creatinine of > 50% from baseline (6050 and 8510) • New requirement for dialysis (9001 and 9002) (Unadjusted or actual number of acute kidney injury events)
Exclusions	Patients with ***any*** of the following: • Missing pre-procedure Creatinine (6050) or post-procedure Creatinine (8510) and New Requirement for Dialysis = "No" (9001, 9002) • Currently on dialysis (4560) • Discharged on the same day (10101) as the PCI procedure (7000)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	Acute Kidney Injury (AKI) is a serious complication after PCI and is associated with increased incidence of in-hospital and follow-up myocardial infarction, dialysis, and death. Furthermore, small increases in serum creatinine have been associated with increased hospital length of stay and excess costs. This metric is helpful in providing risk-adjusted feedback on AKI, informing clinical decision-making, and directing the use of strategies to avoid AKI and improve the safety of PCI procedures.
Relevant Citations	1. Gurm H, Seth M, Kooiman J, et al. A novel tool for reliable and accurate prediction of renal complications in patients undergoing percutaneous coronary intervention. J Am Coll Cardiol. 2013;61(22):2242-2248. 2. Mehran R, Aymong ED, Nikolsky E, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: development and initial validation. J Am Coll Cardiol. 2004;44(7):1393-1399. 3. Mehta RL, Kellum JA, Shah SV, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care. 2007;11(2):R31.

PCI in-hospital Expected Acute Kidney Injury (all patients) **Description:** Your PCI in-hospital expected acute kidney injury events for patients with PCI procedures using the NCDR® PCI risk adjusted AKI model	
Cumulative Sum	Cumulative sum of the predicted or expected probability of an acute kidney injury event of all eligible patients who had a PCI (7050) in the reporting timeframe (alive or deceased) based on the variables and coefficients in the NCDR® risk model (expressed as a decimal).
Exclusions	Patients with ***any*** of the following: • Missing pre-procedure Creatinine (6050) or post-procedure Creatinine (8510) and New Requirement for Dialysis = "No" (9001, 9002) • Currently on dialysis (4560) • Discharged on the same day (10101) as the PCI procedure (7000)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	Acute Kidney Injury (AKI) is a serious complication after PCI and is associated with increased incidence of in-hospital and follow-up myocardial infarction, dialysis, and death. Furthermore, small increases in serum creatinine have been associated with increased hospital length of stay and excess costs. This metric is helpful in providing risk-adjusted feedback on AKI, informing clinical decision-making, and directing the use of strategies to avoid AKI and improve the safety of PCI procedures.
Relevant Citations	1. Gurm H, Seth M, Kooiman J, et al. A novel tool for reliable and accurate prediction of renal complications in patients undergoing percutaneous coronary intervention. J Am Coll Cardiol. 2013;61(22):2242-2248. 2. Mehran R, Aymong ED, Nikolsky E, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: development and initial validation. J Am Coll Cardiol. 2004;44(7):1393-1399. 3. Mehta RL, Kellum JA, Shah SV, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care. 2007;11(2):R31.

PCI in-hospital Observed/Expected Acute Kidney Injury (all patients) **Description:** Your in-hospital observed to expected ratio of acute kidney injury events for patients with PCI procedures using the NCDR® PCI risk adjusted AKI model	
Ratio	Ratio of Observed to Expected (O/E) acute kidney injury events for patients who had a PCI (7050) Observed/Expected Bleeding Ratio (O/E Ratio) – provides feedback on the comparison between the observed to expected. If the O/E ratio is > 1 then there were more deaths than expected. If the ratio is equal to 1 then there were the same number of deaths as expected. If the O/E ratio is < 1 then there were less deaths than expected.
Exclusions	Patients with ***any*** of the following: • Missing pre-procedure Creatinine (6050) or post-procedure Creatinine (8510) and New Requirement for Dialysis = "No" (9001, 9002) • Currently on dialysis (4560) • Discharged on the same day (10101) as the PCI procedure (7000)
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator (7054) of the ***Index*** PCI procedure
Clinical Rationale/ Recommendation	Acute Kidney Injury (AKI) is a serious complication after PCI and is associated with increased incidence of in-hospital and follow-up myocardial infarction, dialysis, and death. Furthermore, small increases in serum creatinine have been associated with increased hospital length of stay and excess costs. This metric is helpful in providing risk-adjusted feedback on AKI, informing clinical decision-making, and directing the use of strategies to avoid AKI and improve the safety of PCI procedures.
Relevant Citations	1. Gurm H, Seth M, Kooiman J, et al. A novel tool for reliable and accurate prediction of renal complications in patients undergoing percutaneous coronary intervention. J Am Coll Cardiol. 2013;61(22):2242-2248. 2. Mehran R, Aymong ED, Nikolsky E, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: development and initial validation. J Am Coll Cardiol. 2004;44(7):1393-1399. 3. Mehta RL, Kellum JA, Shah SV, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care. 2007;11(2):R31.

Efficiency Metrics

22. Median post-procedure length of stay (patients with STEMI) **Description:** Median time (in days) from the start of the PCI procedure to discharge for all STEMI patients	
Median	Median time from ***the index (first)*** STEMI procedure end date/time (7005) ***to*** discharge date/time (10101) *A 24-hour period = 1 day; days are reported with two decimal precision
Population	Patients with PCI for STEMI (7050, 7825)
Population Exclusions	• Patients discharged to another acute care facility (10110), ***or***: • Patients who die during the procedure (10120)
Population Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Admitting (3053) • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	Length of stay (LOS) is a measure of efficiency and resource utilization. Reporting the median LOS is preferred over the mean LOS because outliers with either short or extended LOS can skew the mean. Length of stay can be affected by facility processes, CV professional availability, discharge needs/placement, and procedure related complications. Prolonged LOS following primary PCI for STEMI is associated with higher rates of mortality and major adverse cardiac events. Several clinical features associated with an increased LOS include co-morbid conditions, multivessel disease, complex coronary lesions, vascular complications, transfusion, IABP utilization, shock or heart failure, and renal insufficiency. (1, 2)
Relevant Citations	1. Seto AH, Shroff A, Abu-Fadel M, et al. Length of stay following percutaneous coronary intervention: An expert consensus document update from the society for cardiovascular angiography. Catheter Cardiovasc Interven. 2018;1-15. 2. Swaminathan RV, Rao SV, McCoy LA, et al. Hospital length of stay and clinical outcomes in older STEMI patients after primary PCI: A Report from the National Cardiovascular Data Registry. J Am Coll Cardiol. 2015;65:1161-1171.

46. Median post-procedure length of stay (patients with uncomplicated STEMI) **Description:** Median time (in days) from the start of the PCI procedure to discharge for uncomplicated STEMI patients	
Median	Median time from ***the index (first)*** STEMI procedure end date/time (7005) ***to*** discharge date/time (10101) *A 24-hour period = 1 day; days are reported with two decimal precision
Population	Patients with PCI for STEMI
Population Exclusions	PCI procedures with ***any*** of the following concomitant procedures (7066) during the same cath lab visit: • LAAO • Mitral Clip • Peripheral intervention • Structural repair • TAVR • EP study ***OR*** Patients with ***any*** of the following: • Cardiac arrest pre-procedure (Out-of-hospital cardiac arrest (4630), cardiac arrest at transferring facility (4635), or cardiac arrest at this facility (7340)) • Cardiogenic shock (7415) • Refractory cardiogenic shock (7415) • Ventricular Support (7420) • Thrombolytics (7829) • Discharged to another acute care hospital (10110) • Death during the procedure (10120) • Creatinine increase ≥ 0.3 (from pre to post-creatinine) (6050, 8510) • Hemoglobin drop of ≥ 4g/dl (from pre to post-hemoglobin) (6030, 8505) • TIMI flow (post-intervention) of "0" or "1" (8026) • Any of the following interventions during the hospitalization (10031): – CABG – Cardiac Surgery (non-CABG) – Surgery (non-cardiac) – Valvular intervention – Structural Heart intervention (non-valvular) – EP study
Time Period	Four consecutive quarters
CV Professional Reporting	CV professional was involved in care of the patient as ***any*** of the following: • Admitting (3053) • PCI Operator (7054) • Discharge (10073)
Clinical Rationale/ Recommendation	Length of stay (LOS) is a measure of efficiency and resource utilization. Reporting the median LOS is preferred over the mean LOS because outliers with either short or extended LOS can skew the mean. Length of stay can be affected by facility processes, CV professional availability, discharge needs/placement, and procedure related complications.

	Prolonged LOS following primary PCI for STEMI is associated with higher rates of mortality and major adverse cardiac events. Several clinical features associated with an increased LOS include: co-morbid conditions, multivessel disease, complex coronary lesions, vascular complications, transfusion, IABP utilization, shock or heart failure, and renal insufficiency. (1, 2)
Relevant Citations	1. Seto AH, Shroff A, Abu-Fadel M, et al. Length of stay following percutaneous coronary intervention: An expert consensus document update from the society for cardiovascular angiography. Catheter Cardiovasc Interven. 2018;1-15. 2. Swaminathan RV, Rao SV, McCoy LA, et al. Hospital length of stay and clinical outcomes in older STEMI patients after primary PCI: A Report from the National Cardiovascular Data Registry. J Am Coll Cardiology 2015;65:1161-1171.

Appropriate Use Criteria (AUC) for Coronary Revascularization Metrics

The American College of Cardiology and its collaborators believe that an ongoing review of one's practice using the Appropriate Use Criteria will help guide more effective, efficient, and equitable allocation of healthcare resources, and ultimately lead to better patient outcomes. The intent of the Appropriate Use Criteria is to provide a framework to evaluate overall clinical practice and improve the quality of care.

PCI procedures not classifiable for AUC reporting (all patient presentations) **Description:** Percentage of PCI procedures that were not able to be classified by the AUC	
Numerator	PCI procedures that could not be mapped to an Appropriate Use Criteria indication
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with ACS or SIHD
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	An AUC indication cannot be identified to associate with the patient's clinical scenario due to either missing or indeterminate variables (e.g. stress test results).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 Appropriate use criteria for coronary revascularization in patients with acute coronary syndromes: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:570–91. 3. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2017 Appropriate use criteria for coronary revascularization in patients with stable ischemic heart disease: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:2212–41.

PCI procedures that were evaluated as Appropriate (PCI patients with acute coronary syndromes) **Description:** Percentage of PCI procedures for acute coronary syndromes that were evaluated as Appropriate by Appropriate Use Criteria guidelines	
Numerator	PCI procedures for acute coronary syndromes (ACS) that were evaluated as "Appropriate" according to the AUC guidelines
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with ACS
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	The procedure is an appropriate option for the management of patients in this population due to the benefits generally outweighing the risks; an effective option for individual care plans, although not always necessary depending on physician judgement and patient-specific preferences (i.e., procedure is generally acceptable and is generally reasonable for the indication/clinical scenario).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 Appropriate use criteria for coronary revascularization in patients with acute coronary syndromes: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:570–91.

PCI procedures that were evaluated as May Be Appropriate (PCI patients with acute coronary syndromes) **Description:** Percentage of PCI procedures for acute coronary syndromes that were evaluated as May Be Appropriate by Appropriate Use Criteria guidelines	
Numerator	PCI procedures for acute coronary syndromes that were evaluated as "May Be Appropriate" according to the AUC guidelines
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with ACS
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	At times, the procedure is an appropriate option for the management of patients in this population due to variable evidence or agreement regarding the risk-benefit ratio, potential benefit on the basis of practice experience in the absence or evidence, and/or variability in the population; effectiveness for individual care must be determined by the patient's physician in consultation with the patient on the basis of additional clinical variables and judgment along with patient preferences (i.e., procedure may be acceptable and may be reasonable for the indication/clinical scenario).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 Appropriate use criteria for coronary revascularization in patients with acute coronary syndromes: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:570–91.

PCI procedures that were evaluated as Rarely Appropriate (PCI patients with acute coronary syndromes) **Description:** Percentage of PCI procedures for acute coronary syndromes that were evaluated as Rarely Appropriate by Appropriate Use Criteria guidelines	
Numerator	PCI procedures for acute coronary syndromes that were evaluated as "Rarely Appropriate" according to the AUC guidelines
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with ACS
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	The procedure is a rarely an appropriate option for the management of patients in this population due to the lack of clear benefit/risk advantage; rarely, an effective option for individual care plans; exception should have documentation of the clinical reasons for proceeding with this care option (i.e., procedure is not generally acceptable and is not generally reasonable for the indication/clinical scenario).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 Appropriate use criteria for coronary revascularization in patients with acute coronary syndromes: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:570–91.

PCI procedures that were evaluated as Appropriate (PCI patients with stable ischemic heart disease) **Description:** Percentage of PCI procedures for stable ischemic heart disease that were evaluated as Appropriate by Appropriate Use Criteria guidelines	
Numerator	PCI procedures for stable ischemic heart disease that were evaluated as "Appropriate" according to the AUC guidelines
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with SIHD
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	The procedure is an appropriate option for the management of patients in this population due to the benefits generally outweighing the risks; an effective option for individual care plans, although not always necessary depending on physician judgement and patient-specific preferences (i.e., procedure is generally acceptable and is generally reasonable for the indication/clinical scenario).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2017 Appropriate use criteria for coronary revascularization in patients with stable ischemic heart disease: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:2212–41.

PCI procedures that were evaluated as May Be Appropriate (PCI patients with stable ischemic heart disease) **Description:** Percentage of PCI procedures for stable ischemic heart disease that were evaluated as May Be Appropriate by Appropriate Use Criteria guidelines	
Numerator	PCI procedures for stable ischemic heart disease that were evaluated as "May Be Appropriate" according to the AUC guidelines
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with SIHD
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	At times, the procedure is an appropriate option for the management of patients in this population due to variable evidence or agreement regarding the risk-benefit ratio, potential benefit on the basis of practice experience in the absence or evidence, and/or variability in the population; effectiveness for individual care must be determined by the patient's physician in consultation with the patient on the basis of additional clinical variables and judgment along with patient preferences (i.e., procedure may be acceptable and may be reasonable for the indication/clinical scenario).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2017 Appropriate use criteria for coronary revascularization in patients with stable ischemic heart disease: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:2212–41.

PCI procedures that were evaluated as Rarely Appropriate (PCI patients with stable ischemic heart disease) **Description:** Percentage of PCI procedures for stable ischemic heart disease that were evaluated as Rarely Appropriate by Appropriate Use Criteria guidelines	
Numerator	PCI procedures for stable ischemic heart disease that were evaluated as "Rarely Appropriate" according to the AUC guidelines
Denominator	PCI procedures (with/without diagnostic coronary angiography) for patients with SIHD
Denominator Exclusions	None
Denominator Exceptions	None
Time Period	Four consecutive quarters
CV Professional Reporting	PCI Operator(s) (7054)
Clinical Rationale/ Recommendation	The procedure is a rarely an appropriate option for the management of patients in this population due to the lack of clear benefit/risk advantage; rarely, an effective option for individual care plans; exception should have documentation of the clinical reasons for proceeding with this care option (i.e., procedure is not generally acceptable and is not generally reasonable for the indication/clinical scenario).
Relevant Citations	1. Hendel RC, Lindsay BD, Allen, JM, et al. ACC Appropriate use criteria methodology: 2018 Update: A report of the American College of Cardiology Appropriate Use Criteria Task Force. J Am Coll Cardiol 2018;71:935-948. 2. Patel MR, Calhoon JH, Dehmer GJ, et al. ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2016 Appropriate use criteria for coronary revascularization in patients with acute coronary syndromes: A report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. J Am Coll Cardiol 2017;69:570–91.

Procedure Volume Information

Procedure Volume Data **Description:** Counts of the volume of patients and procedures that you have cared for by procedure type	
Total Number of Patients	Count of patients having a Diagnostic Cath or PCI
Total Diagnostic Cath and PCI procedures performed during the same lab visit	Count of procedures where Diagnostic cath=yes AND PCI procedure=yes
Total Dx Cath Procedures (includes coronary artery and/or LV assessment)	Count of procedures where Diagnostic Cath Procedure=yes
Total Percutaneous Coronary Intervention Procedures (PCI)	Count of procedures where PCI procedure=yes
Clinical Rationale/ Recommendation	According to the ACCF/AHA/SCAI 2013 Update of the Clinical Competence Statement on Coronary Artery Interventional Procedures the following are recommendations for provider competence; • Participate in PCI quality programs of the hospital, including review of major complications. • Participate in a hospital-based state, regional, or national database to measure risk-adjusted PCI outcomes of the laboratory and compare them to regional and national benchmarks for improving quality of care. • Based on available data and the judgment of the writing committee involving all of these considerations, the writing committee recommends interventional cardiologists perform a minimum of 50 coronary interventional procedures per year (averaged over a 2-year period) to maintain competency.
Relevant Citations	Harold, HG, et. al. ACCF/AHA/SCAI 2013 Update of the Clinical Competence Statement on Coronary Artery Interventional Procedures 10.1016/j.jacc.2013.05.002

Total STEMI \ NSTEMI PCI Procedures **Description:** Counts of PCI procedures by diagnosis of NSTEMI and STEMI	
Total Non-STEMI PCI procedures performed	Count of PCI procedures with a CAD presentation=non-STEMI
Total STEMI PCI procedures performed	Count of PCI procedures with a CAD presentation=STEMI
Clinical Rationale/ Recommendation	Patients presenting with STEMI/NSTEMI are at a higher risk of adverse events than elective PCI cases.
Relevant Citations	Krumholz HM, Anderson JL, Bachelder BL, et al. ACC/AHA 2008 performance measures for adults with ST-elevation and non–ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for ST-Elevation and Non–ST-Elevation Myocardial Infarction). J Am Coll Cardiol 2008;52:2046 –99.

Procedure Access Sites **Description:** Counts of PCI procedures based on arterial access for the procedure.	
Eligible Procedures	Count of procedures where diagnostic cath=yes OR PCI procedure=yes
Femoral	Count of procedures with Arterial Access Site = femoral
Brachial	Count of procedures with Arterial Access Site = brachial
Radial	Count of procedures with Arterial Access Site = radial
Other	Count of procedures with Arterial Access Site = other
Clinical Rationale/ Recommendation	Bleeding complications after PCI are associated with increased morbidity, mortality and costs. This measure is helpful in providing feedback on choice of arterial access site which may influence bleeding complications, clinical decision-making, and directing the use of bleeding avoidance strategies to improve the safety of PCI procedures.
Relevant Citations	Rao SV, Ou FS, Wang TY et al. Trends in the prevalence and outcomes of radial and femoral approaches to percutaneous coronary intervention: a report from the national cardiovascular data registry. JACC Cardiovasc Interv 2008;1:379-86. Marso SP, Amin AP, House JA et al. Association between use of bleeding avoidance strategies and risk of periprocedural bleeding among patients undergoing percutaneous coronary intervention. JAMA 2010;303:2156-64. Mehta SK, Frutkin AD, Lindsey JB et al. Bleeding in patients undergoing percutaneous coronary intervention: The development of a clinical risk algorithm from the National Cardiovascular Data Registry. Circulation: Cardiovascular Interventions 2009;2:222-229.

Incidence of non-obstructive CAD **Description:** Patients having coronary angiography where all major coronary branches have non-obstructive disease	
Numerator	Count of diagnostic coronary angiography procedures with all coronary anatomy territories having <50% stenosis
Denominator	Count of Coronary Angiography procedures
Inclusion Criteria	Elective diagnostic coronary angiography procedures Data submissions that passed NCDR data inclusion thresholds
Exclusion Criteria	Prior CABG Pre-op evaluation for non-cardiac surgery Cardiac transplant evaluation type of "Donor for cardiac transplant" Rx recommendation after diagnostic cath of "Other cardiac therapy w/out CABG/PCI" Data submissions with Population Status 'A' (submitting PCI only)
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	This purpose of this metric is to identify diagnostic cath procedures with "normal" results. Because the constellation of findings characteristic of heart disease is non-specific, there will (and should) be patients who undergo diagnostic catheterization who have insignificant coronary artery disease. However, given the potential for physicians to vary with respect to their threshold for recommending diagnostic catheterization, it is important for hospitals to have a process that permits that variation to be recognized, discussed, and managed.

Stress testing with Spect MPI performed and the results were not available in the medical record **Description:** Percentage of patients with a Spect MPI performed prior to the PCI that did not have test results available within their medical record prior to the PCI.	
Numerator	Patients with no Spect MPI results coded
Denominator	PCI patients with Spect MPI performed
Inclusion	PCI procedures Patients with Spect MPI performed prior to the intervention Data submissions that passed NCDR data inclusion thresholds
Exclusions	None
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	Test results from these critical diagnostic studies are essential to have available for decision making surrounding ordering a PCI. A significant number of the indications for appropriate PCI procedures rely on the test results and estimation of risk for these patients. A measure evaluating the availability of the test results will encourage communication and care coordination.
Relevant Citations	Patel MR, Spertus JA, Brindis RG., et al. "ACCF proposed method for evaluating the appropriateness of cardiovascular imaging." J Am Coll Cardiol. 2005 Oct 18;46(8):1606-13. Fihn SD, Gardin JM, Abrams J, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol. 2012;60(24):e44-e164

Elective PCIs with prior positive stress or imaging study **Description:** Proportion of elective PCI procedures with an antecedent stress or imaging study with a positive result (suggestive of ischemia) or with a fractional flow reserve value of <=0.8 performed during the procedure.	
Numerator	Count of PCI procedures with a "Positive" stress or imaging study or a fractional flow reserve (FFR) ratio of ≤0.8
Denominator	Count of PCI procedures
Inclusion Criteria	Elective PCI Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	CAD Presentation of "Unstable Angina", "NSTEMI" or "STEMI" CCS IV Anginal Classification Staged PCI Cardiac Transplant Evaluation
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Several studies have established that for patients with stable CAD outcomes do not differ between PCI with medical therapy and medical therapy alone. Noninvasive testing prior to elective PCI for patients with stable CAD (without acute coronary syndrome) can help select patients that will benefit from PCI. The 2012 appropriateness criteria for coronary revascularization require that, for patients without acute coronary syndromes, results from non-invasive testing be either low-risk, intermediate risk, or high risk, or that results from FFR be <= 0.80 be used to validate the need for revascularization.
Relevant Citations	Levine GN, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am CollCardiol 2011; 58:e44–122 Patel MR, et al. ACCF/SCAI/STS/AATS/AHA/ASNC/HFSA/SCCT 2012 appropriate use criteria for coronary revascularization focused update: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Association for Thoracic Surgery, American Heart Association, American Society of Nuclear Cardiology, and the Society of Cardiovascular Computed Tomography. J Am Coll Cardiol 2012;59:857–81. Tonino, P.A., et al. Fractional Flow Reserve versus Angiography for Guiding Percutaneous Coronary Intervention. New England Journal of Medicine, vol 360, #3, January 15, 2009

Median time to immediate PCI for STEMI patients (in minutes) **Description:** Your patients' median time from hospital arrival to immediate PCI for STEMI patients in minutes.	
Median	Median time for STEMI PCI procedure *from* "Arrival date/time" or STEMI noted on "Subsequent ECG date/time" ***to*** "First Device Activation date/time"
Inclusion Criteria	PCI procedures with PCI indication of "Immediate PCI for STEMI" Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	"Non-system reason for delay" ***and*** a time to "First Device Activation date/time" of >90minutes Transferred In for Immediate PCI for STEMI
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	According to the ACC/AHA performance measures for STEMI/NSTEMI report, "Acute reperfusion therapy for patients with STEMI significantly reduces the risk of death and should be provided to all eligible patients." Hospital policies and procedures materially affect door-to-balloon time. This measure is insensitive to differences in case mix. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction recommends: "Primary PCI should be performed as quickly as possible with a goal of a medical contact–to-balloon or door-to-balloon interval of within 90 minutes."
Relevant Citations	Krumholz HM, Anderson JL, Bachelder BL, et al. ACC/AHA 2008 performance measures for adults with ST-elevation and non–ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for ST-Elevation and Non–ST-Elevation Myocardial Infarction). J Am Coll Cardiol 2008;52:2046 –99.

Proportion of STEMI patients receiving intermediate PCI w/in 90 minutes **Description:** Proportion of your STEMI patients with a time from the hospital arrival (or subsequent ECG if ST elevation first noted on subsequent ECG) to immediate PCI <=90 minutes	
Numerator	Count of STEMI PCI procedures with "Arrival date/time" *or* STEMI noted on "Subsequent ECG date/time" ***to*** "First Device Activation date/time" of ≤90 minutes
Denominator	Count of PCI procedures
Inclusion Criteria	PCI procedures with PCI Indication of "Immediate PCI for STEMI" Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	"Non-system reason for delay" ***and*** a time to "First Device Activation date/time" of >90minutes Transferred In for Immediate PCI for STEMI
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	According to the ACC/AHA performance measures for STEMI/NSTEMI report, "Acute reperfusion therapy for patients with STEMI significantly reduces the risk of death and should be provided to all eligible patients." Hospital policies and procedures materially affect door-to-balloon time. This measure is insensitive to differences in case mix. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction recommends: "Primary PCI should be performed as quickly as possible with a goal of a medical contact–to-balloon or door-to-balloon interval of within 90 minutes."
Relevant Citations	Krumholz HM, Anderson JL, Bachelder BL, et al. ACC/AHA 2008 performance measures for adults with ST-elevation and non–ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for ST-Elevation and Non–ST-Elevation Myocardial Infarction). J Am Coll Cardiol 2008;52:2046 –99.

Median time from ED arrival at STEMI transferring facility to ED arrival at STEMI receiving facility among transferred patients. **Description:** Your patients' median time from arrival at transferring facility to ED arrival at STEMI receiving facility among transferred patients.	
Median	ED presentation at referring facility date/time and arrival at your facility date/time for patients with an admit source of "transfer in from another acute care facility"
Inclusion Criteria	-PCI procedures -PCI Indication = immediate -Transfer in for immediate PCI for STEMI=Yes -Non-system reason for delay =none -Non-system reason for delay AND a "time to immediate PCI" <=90" -Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	-Non-system reason for delay AND a "time to immediate PCI" >90"
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Class I: 1. Patients with STEMI who have cardiogenic shock and are less than 75 years of age should be brought immediately or secondarily transferred to facilities capable of cardiac catheterization and rapid revascularization (PCI or CABG) if it can be performed within 18 hours of onset of shock. (Level of Evidence: A) 2. Patients with STEMI who have contraindications to fibrinolytic therapy should be brought immediately or secondarily transferred promptly (i.e., primary receiving hospital door-to-departure time less than 30 minutes) to facilities capable of cardiac catheterization and rapid revascularization (PCI or CABG). (Level of Evidence: B)
Relevant Citations	Krumholz HM, Anderson JL, Bachelder BL, et al. ACC/AHA 2008 performance measures for adults with ST-elevation and non–ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for ST-Elevation and Non–ST-Elevation Myocardial Infarction). J Am Coll Cardiol 2008;52:2046 –99.

Median time from ED arrival at STEMI transferring facility to immediate PCI at STEMI receiving facility among transferred patients (in minutes). **Description:** Identifies the physician patient population median time from transferring facility to arrival at PCI facility for STEMI patients	
Median	Median time for STEMI patients who are "Transferred In for Immediate PCI for STEMI" *from* "ED Presentation at Referring Facility date/time" *or* STEMI noted on "Subsequent ECG date/time" ***to*** "Arrival date/time"
Inclusion Criteria	PCI procedures Transferred In for Immediate PCI for STEMI Data from submissions that pass NCDR data inclusion thresholds
Exclusion Criteria	Admit Source of "Emergency Department" or "Other"
Time period	Four consecutive quarters (ex. - the 2011 q4 report includes 2011 quarters 1-4).
Clinical Rationale/ Recommendation	According to the ACC/AHA performance measures for STEMI/USTEMI report, "The benefits of timely acute reperfusion for STEMI with either fibrinolysis or primary percutaneous coronary intervention (PCI) are substantial. In centers where PCI is not available on-site, patients may be transferred to another facility for treatment. Because delayed PCI may not be as beneficial as timely fibrinolysis, opting for transfer for PCI rather than fibrinolysis requires that transfer be performed in a timely manner." Class I: 1. Patients with STEMI who have cardiogenic shock and are less than 75 years of age should be brought immediately or secondarily transferred to facilities capable of cardiac catheterization and rapid revascularization (PCI or CABG) if it can be performed within 18 hours of onset of shock. (Level of Evidence: A) 2. Patients with STEMI who have contraindications to fibrinolytic therapy should be brought immediately or secondarily transferred promptly (i.e., primary receiving hospital door-to-departure time less than 30 minutes) to facilities capable of cardiac catheterization and rapid revascularization (PCI or CABG). (Level of Evidence: B)
Relevant Citations	Krumholz HM, Anderson JL, Bachelder BL, et al. ACC/AHA 2008 performance measures for adults with ST-elevation and non–ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for ST-Elevation and Non–ST-Elevation Myocardial Infarction). J Am Coll Cardiol 2008;52:2046 –99.

Median fluoro time (in minutes) **Description:** Identifies the median fluoro time for PCI procedures	
Median	Fluoro time
Inclusion Criteria	PCI procedures (with or without diagnostic cath) Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Prior CABG An 'other' procedure during the same lab visit PCI of >1 vessel/lesion.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	2011 PCI Guidelines - 4.3. Radiation Safety CLASS I Recommendation: Cardiac catheterization laboratories should routinely record relevant available patient procedural radiation dose data (e.g., total air kerma at the international reference point [Ka r], air kerma air product [PKA], fluoroscopy time, number of cine images), and should define thresholds with corresponding follow-up protocols for patients who receive a high procedural radiation dose. (Level of Evidence: C)
Relevant Citations	2011 PCI Guidelines (J Am Coll Cardiol 2011; 58:e44–122)

Patients with post procedure Myocardial Infarction (when routinely collecting post-PCI biomarkers) **Description:** Proportion of patients with an intra or post-procedure MI	
Numerator	Count of PCI procedures with post procedure MI
Denominator	Count of PCI procedures
Inclusion Criteria	Elective PCI procedures Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Submissions with < 90% of patients with biomarkers (troponin and/or CK) coded post procedure LOS <1 day
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	MI following PCI is a major complication that is associated with the success of the PCI procedure. Studies debate the most accurate way to define post procedure MI (with or without routine collection of biomarkers). Post procedure MI increases patient morbidity and mortality, as well as health care resource use. --- There is evidence that hospitals that routinely collect biomarkers have a higher rate of periprocedural MI than those who don't. Thus this metric is reported separately, based on the routine collection of biomarkers (see metric 14 as well). "Hospitals that routinely performed marker testing had higher rates of periprocedural MI detection despite a trend toward lower mortality and greater adherence to recommended medications that suggest better overall quality of care for PCI patients at these hospitals. Therefore, in the absence of routine cardiac marker surveillance after PCI, the use of periprocedural MI as a quality metric for PCI will be misleading." [1]
Relevant Citations	Levine GN, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol 2011; 58:e44–122 [1]Wang TY, Peterson ED, Dai D, et al. Patterns of cardiac marker surveillance after elective percutaneous coronary intervention and implications for the use of periprocedural myocardial infarction as a quality metric: a report from the National Cardiovascular Data Registry (NCDR). J Am Coll Cardiol. 2008;51:2068

Patients with post procedure Myocardial Infarction (when not routinely collecting post-PCI biomarkers) **Description:** Proportion of patients with an intra or post-procedure MI	
Numerator	Count of PCI procedures with post procedure MI
Denominator	Count of PCI procedures
Inclusion Criteria	Elective PCI Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Submissions with ≥ 90% of patients with biomarkers (troponin and/or CK) coded post procedure LOS <1 day
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	MI following PCI is a major complication that is associated with the success of the PCI procedure. Studies debate the most accurate way to define post procedure MI (with or without routine collection of biomarkers). Post procedure MI increases patient morbidity and mortality, as well as health care resource use. --- There is evidence that hospitals that routinely collect biomarkers have a higher rate of periprocedural MI than those who don't. Thus this metric is reported separately, based on the routine collection of biomarkers (see metric 14 as well). "Hospitals that routinely performed marker testing had higher rates of periprocedural MI detection despite a trend toward lower mortality and greater adherence to recommended medications that suggest better overall quality of care for PCI patients at these hospitals. Therefore, in the absence of routine cardiac marker surveillance after PCI, the use of periprocedural MI as a quality metric for PCI will be misleading." [1]
Relevant Citations	Levine GN, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol 2011; 58:e44–122 [1]Wang TY, Peterson ED, Dai D, et al. Patterns of cardiac marker surveillance after elective percutaneous coronary intervention and implications for the use of periprocedural myocardial infarction as a quality metric: a report from the National Cardiovascular Data Registry (NCDR). J Am Coll Cardiol. 2008;51:2068

PCI procedures with creatinine assessed pre and post PCI procedure **Description:** Proportion of your PCI patients with creatinine assessed pre and post procedure	
Numerator	PCI procedures with creatinine assessed pre and post procedure
Denominator	PCI procedures
Inclusion Criteria	PCI procedures Data submissions that passed NCDR data inclusion thresholds
Exclusion Criteria	LOS <1 day Patients with "Death in Lab"
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Acute kidney injury, or "contrast induced nephropathy" is a major, procedure-related complication of PCI. The "risk, injury, failure, loss, end-stage" (RIFLE) classification requires pre and post procedure creatinine to classify acute kidney injury (AKI). The 2011 PCI Guidelines - 4.4. Contrast-Induced AKI Class I Recommendations: 1. Patients should be assessed for risk of contrast induced AKI before PCI. (Level of Evidence: C) 2. Patients undergoing cardiac catheterization with contrast media should receive adequate preparatory hydration. (Level of Evidence: B) 3. In patients with CKD (creatinine clearance <60 mL/min), the volume of contrast media should be minimized. (Level of Evidence: B)
Relevant Citations	Levine GN, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol 2011; 58:e44–122 Biesen, Wim, et al. Defining Acute Renal Failure: RIFLE and Beyond. Clin J Am Soc Nephrol 1: 1314–1319, 2006

Median post-procedure length of stay (in days) for PCI patients with STEMI **Description:** Your median post-procedure length of stay (in days) STEMI patients with PCI	
Median	Median time in days from "Procedure Date" to "Discharge Date" for STEMI patients
Inclusion Criteria	Patients with PCI for STEMI Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Records with invalid values for Admission Date or Discharge Date
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Median LOS will be sensitive to patient characteristics (and therefore case mix). However, there is evidence that hospitals can influence total, pre and post procedure LOS, maximizing efficient resource usage.

Median length of stay post PCI procedure for patients with STEMI and without CABG or without other major surgery during admission. **Description:** The median post PCI procedure length of stay for patients with a PCI indication of STEMI undergoing an isolated PCI procedure (defined by no CABG or other major surgery during episode of care) during the episode of care. This measure reflects an effort to lower costs associated hospital admissions for patients with PCI procedures for STEMI.	
Median	Median time (in days) from "Procedure Date" to 'Discharge Date" for patients with STEMI
Inclusion Criteria	Patients with PCI for STEMI PCI Indications Data from submissions that pass NCDR data inclusion thresholds
Exclusion Criteria	Patients with CABG during admission Patients with Other Major Surgery during admission
Time Period	Consecutive four quarters
Clinical Rationale/ Recommendation	"… The 3 principles of medical ethics are beneficence, autonomy, and justice. Beneficence involves the physician's duty to act in the best interests of the patient and avoid maleficence, or harm (primum non nocere). Autonomy describes the physician's duty to help the patient maintain control over his or her medical treatments. Justice describes the physician's duty to treat the individual patient responsibly with due consideration of other patients and stakeholders in the healthcare system. Ethical considerations specific to PCI have been previously discussed and are highlighted below: •Place the patient's best interest first and foremost when making clinical decisions (beneficence). •Ensure that patients actively participate in decisions affecting their care (autonomy). •Consider how decisions regarding one patient may also affect other patients and providers (justice). •Plan and perform procedures and provide care with the intention of improving the patient's quality of life and/or decreasing the risk of mortality, independent of reimbursement considerations and without inappropriate bias or influence from industry, administrators, referring physicians, or other sources" (Levine, 2011, e.63).

Median length of stay (in days) for PCI patients without STEMI and without CABG or without other major surgery during admission. **Description:** The median post PCI procedure length of stay for patients with a PCI indication that is not STEMI undergoing an isolated PCI procedure (defined by no CABG or other major surgery during episode of care) during the episode of care.	
Median	Median time (in days) from "Procedure Date" to 'Discharge Date" for patients with non-STEMI PCI Indications
Inclusion Criteria	Patients with PCI for non-STEMI PCI Indications Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Patients with CABG during admission Patients with Other Major Surgery during admission
Time Period	Consecutive four quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) to mechanically revascularize the coronary arteries, is performed during more than 1 million episodes of care annually among Medicare recipients. The risks associated with PCI are highest within the first 24 to 48 hours after the procedure and include periprocedural myocardial infarction (MI), acute stent thrombosis, bleeding, or renal failure. Previous studies of Medicare beneficiaries show that up to 9.5% of patients experience at least 1 PCI-related complication (Rao, 2011). Fortunately, short- and long-term outcomes after PCI have improved because of the evolution in device technology and pharmacotherapy. Despite this improvement, patients are usually observed overnight in the hospital after elective PCI to monitor for PCI-related complications. In some hospitals, these patients are observed overnight in short-stay units, while in others, they are observed on traditional

Composite: Discharge Medications in Eligible PCI Patients Description: Patients undergoing PCI who received prescriptions for all medications (aspirin, P2Y12 and statins) for which they were eligible	
Numerator	Patients with a **stent** who had Aspirin, Statin and a P2Y12 prescribed, contraindicated or blinded at discharge OR Patients **without** a stent who had Aspirin and Statin prescribed, contraindicated or blinded at discharge
Denominator	Count of PCI Admissions
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Discharge status of "deceased" Discharge location of "other acute care hospital", "hospice" or "against medical advice".
Timeframe	Four consecutive quarters
Clinical Rationale/ Recommendation	The 2011 PCI Guidelines - 5.7.2. Oral Antiplatelet Therapy Class I Recommendations: 3. After PCI, use of aspirin should be continued indefinitely. (Level of Evidence: A) AND 7. The duration of P2Y12 inhibitor therapy after stent implantation should generally be as follows: a. In patients receiving a stent (BMS or DES) during PCI for ACS, P2Y12 inhibitor therapy should be given for at least 12 months. Options include clopidogrel 75 mg daily, prasugrel 10 mg daily, and ticagrelor 90 mg twice daily. (Level of Evidence: B) b. In patients receiving DES for a non-ACS indication, clopidogrel 75 mg daily should be given for at least 12 months if patients are not at high risk of bleeding. (Level of Evidence: B) c. In patients receiving BMS for a non-ACS indication, clopidogrel should be given for a minimum of 1 month and ideally up to 12 months (unless the patient is at increased risk of bleeding; then it should be given for a minimum of 2 weeks). (Level of Evidence: B) **Reducing LDL-c** is associated with a decrease in mortality and morbidity for patients with coronary artery disease. Lipid-lowering therapy can reduce the risk of cardiovascular outcomes. 1. 2011 AHA/ACCF Secondary Prevention Guidelines class I recommendation for lipid management: 4. In addition to therapeutic lifestyle changes, statin therapy should be prescribed in the absence of contraindications or documented adverse effects (25–29). (Level of Evidence: A) 2. The ACC/AHA 2007 UA/NSTEMI Guidelines recommend:

	Class I Recommendation: Hydroxymethyl glutaryl-coenzyme A reductase inhibitors (**statins),** in the absence of contraindications, **regardless of baseline LDL-**C and diet modification, should be given to post-UA/NSTEMI patients, including post revascularization patients. (*Level of Evidence: A*).
Relevant Citations	2011 PCI Guidelines (J Am Coll Cardiol 2011; 58:e44–122) AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary and Other Atherosclerotic Vascular Disease: 2011 Update (JACC 2011, Vol. 58, No. 23) ACC/AHA 2007 Guidelines for the Management of Patients With Unstable Angina/Non–ST-Elevation Myocardial Infarction:J Am Coll Cardiol, 2007; 50:1-157; This measure has been endorsed by the National Quality Forum, measure 964 (http://www.qualityforum.org/Measures_List.aspx?#k=)

Patients with aspirin prescribed at discharge **Description:** Proportion of patients with aspirin prescribed at discharge.	
Numerator	Count of patients having PCI with ASA prescribed at discharge
Denominator	Count of PCI admissions
Inclusion Criteria	PCI during the Episode of Care Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Aspirin coded as "contraindicated" or "blinded" Discharge status of "deceased" Discharge location of "other acute care hospital", "hospice" or "against medical advice"
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	The 2011 PCI Guidelines - 5.7.2. Oral Antiplatelet Therapy Class I Recommendations: 3. After PCI, use of aspirin should be continued indefinitely. (Level of Evidence: A)
Relevant Citations	2011 PCI Guidelines (J Am Coll Cardiol 2011; 58:e44–122)

Patients with a statin prescribed at discharge **Description:** Proportion of patients with a statin prescribed at discharge.	
Numerator	Count of patients having PCI with a Statin prescribed at discharge
Denominator	Count of PCI admissions
Inclusion Criteria	Patients having PCI during the Episode of Care Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Statin coded as "contraindicated" or "blinded" Discharge status of "deceased" Discharge location of "other acute care hospital", "hospice" or "against medical advice"
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Reducing LDL-c is associated with a decrease in mortality and morbidity for patients with coronary artery disease. Lipid-lowering therapy can reduce the risk of cardiovascular outcomes. 3. 2011 AHA/ACCF Secondary Prevention Guidelines class I recommendation for lipid management: 4. In addition to therapeutic lifestyle changes, statin therapy should be prescribed in the absence of contraindications or documented adverse effects (25–29). (Level of Evidence: A) 4. The ACC/AHA 2007 UA/NSTEMI Guidelines recommend: Class I Recommendation: Hydroxymethyl glutaryl-coenzyme A reductase inhibitors (**statins),** in the absence of contraindications, **regardless of baseline LDL-**C and diet modification, should be given to post-UA/NSTEMI patients, <u>including post revascularization patients</u>. (*Level of Evidence: A*). For UA/NSTEMI patients with elevated LDL-C (greater than or equal to 100 mg per dL), cholesterol-lowering therapy should be initiated or intensified to achieve an LDL-C of less than 100 mg per dL (*Level of Evidence: A*).
Relevant Citations	1. AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary and Other Atherosclerotic Vascular Disease: 2011 Update (JACC 2011, Vol. 58, No. 23) 2. ACC/AHA 2007 Guidelines for the Management of Patients With Unstable Angina/Non–ST-Elevation Myocardial Infarction: J Am Coll Cardiol, 2007; 50:1-157;

Patients with a P2Y12 inhibitor prescribed at discharge **Description:** Proportion of patients with a stent implanted that had a thienopyridine/P2Y12 Inhibitor prescribed at discharge.	
Numerator	Count of patients with a Thienopyridine or P2Y12 Inhibitor (Clopidogrel, Prasugrel, Ticlopidine or Ticagrelor) prescribed, blinded or contraindicated at discharge
Denominator	Count of PCI admissions with a stent implanted
Inclusion Criteria	PCI admissions with a stent implanted Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Discharge status of "deceased" Discharge location of "other acute care hospital", "hospice" or "against medical advice"
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	The 2011 PCI Guidelines - 5.7.2. Oral Antiplatelet Therapy Class I Recommendations: 7. The duration of P2Y12 inhibitor therapy after stent implantation should generally be as follows: a. In patients receiving a stent (BMS or DES) during PCI for ACS, P2Y12 inhibitor therapy should be given for at least 12 months. Options include clopidogrel 75 mg daily, prasugrel 10 mg daily, and ticagrelor 90 mg twice daily. (Level of Evidence: B) b. In patients receiving DES for a non-ACS indication, clopidogrel 75 mg daily should be given for at least 12 months if patients are not at high risk of bleeding. (Level of Evidence: B) c. In patients receiving BMS for a non-ACS indication, clopidogrel should be given for a minimum of 1 month and ideally up to 12 months (unless the patient is at increased risk of bleeding; then it should be given for a minimum of 2 weeks). (Level of Evidence: B)
Relevant Citations	2011 PCI Guidelines (J Am Coll Cardiol 2011; 58:e44–122)

ACE-I or ARB prescribed at discharge for patients with an ejection fraction < 40% who had a PCI during the episode of care **Description:** Percentage of patients with a left ventricular ejection fraction (LVEF) < 40% who were prescribed ACE inhibitor or ARB at hospital discharge.	
Numerator	Patients with an ACE Inhibitor or an ARB prescribed, blinded or contraindicated at discharge
Denominator	Patients with PCI who had an EF < 40%
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds. Patients with PCI who had an EF <40%
Exclusion Criteria	Discharge status of "deceased" Discharge location of "other acute care hospital", "hospice" or "against medical advice"
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	ACE inhibitors are recommended in patients with Heart Failure reduced Ejection Fraction (HFrEF) and current or prior symptoms, unless contraindicated, to reduce morbidity and mortality (Class 1, Level of Evidence: A). ARBs are reasonable to reduce morbidity and mortality as alternatives to ACE inhibitors as first-line therapy for patients with Heart Failure reduced Ejection Fraction (HFrEF), especially for patients already taking ARBs for other indications, unless contraindicated (Class IIa, Level of Evidence: A).
Relevant Citations	Pfeffer MA, Braunwald E, MoyéLA, Basta L, Brown EJ Jr, Cuddy TE, Davis BR, Geltman EM, Goldman S, Flaker GC. Effect of captopril on mortality and morbidity in patients with left ventricular dysfunction after myocardial infarction. Results of the survival and ventricular enlargement trial. The SAVE Investigators. N Engl J Med. 1992;327(10):669. Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62(16):e147-e239.

Beta-blockers prescribed at discharge for AMI patients who had a PCI during admission **Description:** Percentage of patients with acute myocardial infarction (AMI) who were prescribed a beta-blocker at hospital discharge. This metric evaluates the process of care associated with the multi-society guidelines recommendations.	
Numerator	Patients with a Beta-blocker prescribed, contraindicated or blinded at discharge
Denominator	AMI patients who had a PCI during the admission
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds Patients having PCI during admission
Exclusion Criteria	Transferred to another hospital Deceased at discharge Left against medical advice Discharged with hospice care
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation & Relevant Citations	For patients with acute myocardial infarction (MI), beta blocker therapy reduces infarct size and early mortality when started early and lowers the risk of death when continued long term. The evidence supporting the benefit of beta blockers has been obtained primarily from randomized trials that included predominantly patients with ST-elevation MI (STEMI). Multi-society guidelines recommend the use of beta blockers in the AMI patient population. This measure reflects the clinical care process of prescribing beta blockers at discharge for AMI patients who were treated with a PCI during the admission. This process is directly linked with practice guidelines for both AMI patients (O'Gara, 2013). <u>Source:</u> Krumholz HM, Anderson JL, Bachelder BL, et al. ACC/AHA 2008 Performance Measures for Adults With ST-Elevation and Non–ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing Committee to Develop Performance Measures for ST-Elevation and Non–ST-Elevation Myocardial Infarction) Developed in Collaboration With the American Academy of Family Physicians and American College of Emergency Physicians Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, Society for

Cardiac Rehabilitation Patient Referral from an Inpatient Setting **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 a percutaneous coronary intervention (PCI), who are referred to an early outpatient cardiac rehabilitation/secondary prevention program.	
Numerator	Number of patients who have been referred to an outpatient Cardiac Rehabilitation/Secondary Prevention (CR/SP) program prior to hospital discharge or have a documented medical or patient- centered reason why such a referral was not made.
Denominator	All patients who had a PCI during the admission.
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds Patients having PCI during admission
Exclusion Criteria	Patients who expired before discharge. Patients who leave against medical advice. Patients who are Ineligible for cardiac rehab referral
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	Hospitalization offers a unique opportunity to initiate referral to outpatient cardiac rehabilitation. If this has not occurred, the outpatient provider is responsible to ensure patient referral. Many insurers allow cardiac rehabilitation services to begin up to 6 to 12 months following a cardiac event. Therefore, referral is not only the responsibility of the hospital staff but also outpatient physicians with responsibility for the care of patients on an ambulatory basis. The need for increased awareness and referral for patients to a cardiac rehab program spans the multiple specialties

Diagnostic Cath and PCI Outcome

Diagnostic catheterization procedures with vascular access site injury requiring treatment or major bleeding **Description:** Proportion of your patients having a diagnostic cath that experienced access site related injury and/or bleeding	
Numerator	Count of diagnostic cath procedures *with* "Bleeding at Access Site", "Hematoma at Access Site", "Retroperitoneal Bleeding" ***or*** "Other Vascular Complications Requiring Rx"
Denominator	Count of diagnostic cath procedures
Inclusion Criteria	Diagnostic cath only procedures Data submissions that passed NCDR data inclusion thresholds
Exclusion Criteria	PCI during the same lab visit. "CABG" or "other major surgery" during the Episode of Care "GI", "GU" and/or "Other" bleeding events
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	Vascular complications can cause significant discomfort and disability for patients. While rates of complication will be sensitive to patient characteristics (and therefore case mix), there is evidence that hospitals can significantly influence overall complication rates. This can be accomplished through monitoring and analyzing the causes of complications, developing policies and procedures that minimize the risk of complications, and developing policies that assure operator and cath team competency.
Relevant Citations	Mehran R, Rao SV, Bhatt DL et al. Standardized bleeding definitions for cardiovascular clinical trials: a consensus report from the Bleeding Academic Research Consortium. Circulation 2011;123:2736-47.

Composite: Proportion of patients with death, emergency CABG, stroke or repeat target vessel revascularization **Description:** Your proportion of patients with (unadjusted) death, emergency CABG, stroke or repeat target vessel revascularization[1] post procedure up to hospital discharge. [1]Target vessel revascularization is defined as a repeat PCI procedure on the same segment during the same admission	
Numerator	Count of PCI admissions with a discharge status of expired; an emergency CABG, stroke or repeat target vessel revascularization prior to discharge.
Denominator	Count of PCI procedures
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Patients with a stroke AND an elective, urgent or salvage CABG during the same admission.
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	This measure represents a composite of major complications occurring after PCI.

Patients with post procedure stroke **Description:** Proportion of your patients with stroke post procedure (excluding patients with CABG during same admission).	
Numerator	Count of PCI procedures with post procedure stroke
Denominator	Count of PCI procedures
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Patients with CABG or other major surgery during same admission
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	Stroke is one of the major complications occurring after PCI.
Relevant Citations	2011 PCI Guidelines (J Am Coll Cardiol 2011; 58:e44–122) Fuchs S, Stabile E, Kinnaird TD, et al. Stroke complicating percutaneous coronary interventions: incidence, predictors, and prognostic implications. Circulation. 2002;106:86-91.

New requirement for dialysis post PCI in patients without CABG or other major surgeries during admission. **Description:** Percent of patients undergoing isolated PCI procedure (defined by no CABG or other major surgery during episode of care) who have a new requirement for renal dialysis intra or post PCI procedure. This measure evaluates the occurrence of the new need for dialysis as an outcome of a percutaneous coronary intervention (PCI) during a patient's episode of care.	
Numerator	Number of patients who have a new need for dialysis intra or post PCI procedure
Denominator	All patients who had a PCI during the admission
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds Patients having PCI during admission
Exclusion Criteria	Patients with CABG or Other Major Surgery during admission
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	In contemporary studies, contrast induced – acute kidney injury (CI-AKI) requiring dialysis developed in almost 4% of patients with underlying renal impairment and 3% of patients undergoing primary percutaneous coronary interventions (PCI) for acute coronary syndrome. However, only a small proportion of patients continued on chronic dialysis. Although CI-AKI requiring dialysis is relatively rare, the impact on patient prognosis is considerable, with high hospital and 1 year mortality rates (KDIGO, 2012). One study reported the incidence of new CKD Stage 4–5 (eGFR < 30 ml/min) following PCI and found that this occurred in 0.3% of patients (Vuurmans, 2010). Most challenging, however, are patients that present with acute coronary syndromes or myocardial infarction, particularly if complicated by hypotension or cardiogenic shock. Emergency angiography and treatment are usually required. In these circumstances, operators may be forced to use large CM doses without having sufficient time for adequate patient preparation, and in almost all studies patients with acute myocardial infarction have a high risk of CIAKI (McCullough, 2008). All laboratories that use contrast media should have adequate protocols for risk prediction, hydration, and prevention of CI - AKI. While no randomized controlled trials exist for dialysis for life-threatening indications, it is widely accepted that patients with severe hyperkalemia, severe acidosis, pulmonary edema, and uremic complications should be dialyzed emergently. The treatment of acute kidney injury (AKI) with renal replacement therapy (RRT) has the following goals: i) to maintain fluid and electrolyte, acid- base, and solute homeostasis; ii) to prevent further insults to the kidney; iii) to permit renal recovery; and iv) to allow other supportive measures (e.g., antibiotics, nutrition support) to proceed without limitation or complication. Ideally, therapeutic interventions should be designed to achieve the above goals and a systematic assessment of all these factors is key to determining the optimal timing for initiating dialysis (KDIGO, 2012). Source: Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney inter., Suppl. 2012; 2 : 1–138

	Vuurmans T, Byrne J, Fretz E, et al. Chronic kidney injury in patients after cardiac catheterization or percutaneous coronary intervention: a comparison of radial and femoral approaches (from the British Columbia Cardiac and Renal Registries). Heart 2010; 96: 1538–1542. McCullough PA. Radiocontrast-induced acute kidney injury. Nephron Physiol 2008; 109: pp 61–72.
Relevant Citations	Initiate renal replacement therapy (RRT) emergently when life threatening changes in fluid, electrolyte, and acid-base balance exist. (Not Graded). Consider the broader clinical context, the presence of conditions that can be modified with renal replacement therapy (RRT), and trends in laboratory tests – rather than single BUN and creatinine thresholds alone – when making the decision to start RRT. (Not Graded) In individuals who develop changes in kidney function after administration of intravascular contrast media, evaluate for CI-AKI as well as for other possible causes of AKI. (Not Graded) Assess the risk for CI-AKI and, in particular, screen for pre-existing impairment of kidney function in all patients who are considered for a procedure that requires intravascular (i.v. or i.a.) administration of iodinated contrast medium. (Not Graded) We suggest not using prophylactic intermittent hemodialysis (IHD) or hemofiltration (HF) for contrast-media removal in patients at increased risk for CI-AKI. (2C) Source: Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney inter., Suppl. 2012; 2 : 1–138

Cardiac tamponade post PCI in patients without CABG or other major surgery during admission. **Description:** The number of patients undergoing isolated PCI procedure (defined by no CABG or other major surgery during episode of care) who have a cardiac tamponade intra or post procedure.	
Numerator	The number of patients age 18 and older undergoing an isolated PCI with a cardiac tamponade intra or post PCI procedure.
Denominator	All patients undergoing isolated (defined by no CABG or other major surgery during episode of care) percutaneous coronary intervention (PCI).
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds Patients having PCI during admission
Exclusion Criteria	Patients with CABG or Other Major Surgery during admission
Time Period	Four consecutive quarters
Clinical Rationale/ Recommendation	The risk associated with intra procedure coronary perforation is approximately 0.2%, and is most commonly caused by wire perforation, during PCI for CTO or by ablative or oversized devices during PCI of heavily diseased or tortuous coronary arteries (Ellis, 1994). Cardiac tamponade results after a coronary perforation from the accumulation of pericardial fluid under pressure, leading to impaired cardiac filling and hemodynamic compromise. Very little fluid needs to accumulate to produce cardiac tamponade once the pericardium can no longer stretch (Spodick, 2003). Acute cardiac tamponade occurs within minutes, due to trauma, rupture of the heart or aorta, or as a complication of an invasive diagnostic or therapeutic procedure. This generally results in a picture resembling cardiogenic shock that requires urgent reduction in pericardial pressure (Reddy, 1990). In patients with a documented pericardial effusion and clinical evidence of hemodynamic compromise (ie, tachycardia and hypotension producing a picture of cardiogenic shock) consistent with cardiac tamponade, urgent drainage of the pericardial effusion should be performed. Drainage of the effusion can be performed percutaneously using catheter drainage or surgically. Following either percutaneous or surgical drainage of a pericardial effusion in a patient with cardiac tamponade, the patient should be monitored with continuous telemetry and frequent vital signs for at least 24 to 48 hours. Subsequent monitoring with two-dimensional and Doppler echocardiography prior to discharge from the hospital is warranted to confirm adequate fluid removal and to detect possible recurrent fluid accumulation (Maisch, 2004). Source: Ellis SG, Ajluni S, Arnold AZ, et al. Increased coronary perforation in the new device era. Incidence, classification, management, and outcome. Circulation. 1994;90:2725–30 Spodick D. Acute cardiac tamponade. N Engl J Med. 2003;349(7):684. Reddy PS, Curtiss EI, Uretsky BF. Spectrum of hemodynamic changes in cardiac tamponade. Am J Cardiol. 1990;66(20):1487.

	Maisch B, Seferović P, Ristić A, Erbel R, Rienmüller R, Adler Y, Tomkowski WZ, Thiene G, Yacoub MH, Task Force on the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology. Guidelines on the diagnosis and management of pericardial diseases executive summary; The Task force on the diagnosis and management of pericardial diseases of the European society of cardiology. Eur Heart J. 2004;25(7):587.
Relevant Citations	Management of cardiac tamponade can be challenging because of the lack of the validated criteria for the risk stratification that should guide clinicians in the decision-making process. Current guidelines do not cover these issues and no additional guidelines are available from major medical and cardiology societies (Ristic, 2014). Ristic A, Imazio M, Adler Y, et al., Triage strategy for urgent management of cardiac tamponade: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. European Heart Journal. European Heart Journal Advance Access published July 7, 2014. doi:10.1093/eurheartj/ehu217 Retrieved on January 9, 2015 from http://eurheartj.oxfordjournals.org/content/ehj/early/2014/06/20/eurheartj.ehu217.full.pdf.

PCI procedures with transfusion of whole blood or red blood cells **Description:** Proportion of your patients who received a transfusion of whole blood or red blood cells after a PCI procedure.	
Numerator	Count of PCI procedures with a RBC/whole blood transfusion
Denominator	Count of PCI procedures
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Patients having CABG or other major surgery during the same admission Patients who have a pre-procedure hgb level of <=8
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	The purpose of this metric is to allow identification of potential overuse of transfusion after PCI procedures. In addition, it points out blood loss, which predicts poor outcomes.

Patients with emergency CABG **Description:** Proportion of your patients having emergency CABG or transferred for emergency CABG during the same episode of care.	
Numerator	Count of your PCI admissions with Emergency CABG at this facility or transferred to another facility for emergency CABG.
Denominator	Count of PCI admissions
Inclusion Criteria	Data from submissions that pass NCDR data inclusion thresholds.
Exclusion Criteria	Emergency CABG date occurs prior to PCI procedure date
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Emergency CABG following PCI is considered one of the major complications that are associated with the PCI procedure and its success. Studies have demonstrated that patient and institutional characteristics, including competency and procedure volume, are related to rates of emergency CABG following PCI. The strongest patient predictors of the need for emergency CABG in several analyses are cardiogenic shock (OR: 11.4), acute MI or emergency PCI (OR: 3.2 to 3.8), multivessel disease (OR: 2.3 to 2.4), and type C lesion (OR: 2.6) (243, 245). In-hospital mortality for emergency CABG ranges from 7.8% to 14% (2011 PCI guidelines).
Relevant Citations	Levine GN, et al. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. J Am Coll Cardiol 2011; 58:e44–122

Appropriate Use Criteria for Coronary Revascularization

Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate **Description:** Proportion of PCI procedures (for patients with ACS) that were evaluated as "appropriate", meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival.	
Numerator	PCI Procedures evaluated as "appropriate" according to AUC guidelines
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	CAD Presentation of "No Sx/No Angina", "Sx unlikely to be ischemic" or "Stable Angina"
Exclusion Criteria at the Facility level	If more than 40% of a facility's PCIs are not classified or calculated using the AUC model, your data will not be displayed in this metric.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (*J Am Coll Cardiol* 2012;59: 857-81)

Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate **Description:** Proportion of PCI procedures (for patients with ACS) that were evaluated as "Inappropriate", meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival.	
Numerator	PCI Procedures evaluated as "inappropriate" according to AUC guidelines
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	CAD Presentation of "No Sx, No Angina", "Sx unlikely to be ischemic" and "Stable Angina"
Exclusion Criteria at the Facility level	If more than 40% of a facility's PCIs are not classified or calculated using the AUC model, your data will not be displayed in this metric.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (*J Am Coll Cardiol* 2012;59: 857-81)

Patients WITH Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness **Description:** Proportion of PCI procedures (for patients with ACS) that were evaluated as "Uncertain", meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival.	
Numerator	PCI Procedures evaluated as "uncertain" according to AUC guidelines
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	CAD Presentation of "No Sx, No Angina", "Sx unlikely to be ischemic" and "Stable Angina"
Exclusion Criteria at the Facility level	If more than 40% of a facility's PCIs are not classified or calculated using the AUC model, your data will not be displayed in this metric.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (*J Am Coll Cardiol* 2012;59: 857-81)

Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were appropriate **Description:** Proportion of PCI procedures (for patients without ACS) that were evaluated as "appropriate", meaning coronary revascularization is generally acceptable and is a reasonable approach for the indication and is likely to improve the patients' health outcomes or survival.	
Numerator	PCI Procedures evaluated as "appropriate" according to AUC guidelines
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	CAD presentation of "Unstable Angina", "NSTEMI" or "STEMI"
Exclusion Criteria at the Facility level	If more than 40% of a facility's PCIs are not classified or calculated using the AUC model, your data will not be displayed in this metric.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (J Am Coll Cardiol 2012;59: 857-81)

Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were inappropriate **Description:** Proportion of PCI procedures (for patients without ACS) that were evaluated as "Inappropriate", meaning coronary revascularization is not generally acceptable and is not a reasonable approach for the indication and is unlikely to improve the patients' health outcomes or survival.	
Numerator	PCI Procedures evaluated as "inappropriate" according to AUC guidelines
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	CAD presentation of "Unstable Angina", "NSTEMI" or "STEMI"
Exclusion Criteria at the Facility level	If more than 40% of a facility's PCIs are not classified or calculated using the AUC model, your data will not be displayed in this metric.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (J Am Coll Cardiol 2012;59: 857-81)

Patients WITHOUT Acute Coronary Syndrome: Proportion of evaluated PCI procedures that were of uncertain appropriateness **Description:** Proportion of PCI procedures (for patients without ACS) that were evaluated as "Uncertain", meaning coronary revascularization may be acceptable and may be a reasonable approach for the indication. However, some degree of uncertainty exists, implying that more research and/or patient information is needed to determine whether the procedure would improve patients' health outcomes or survival.	
Numerator	PCI Procedures evaluated as "uncertain" according to AUC guidelines
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	CAD presentation of "Unstable Angina", "NSTEMI" or "STEMI"
Exclusion Criteria at the Facility level	If more than 40% of a facility's PCIs are not classified or calculated using the AUC model, your data will not be displayed in this metric.
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (J Am Coll Cardiol 2012;59: 857-81)

Proportion of PCI procedures not classifiable for AUC reporting **Description:** Proportion of PCI procedures that were not classifiable / evaluated for PCI AUC reporting due to incomplete or missing data.	
Numerator	PCI Procedures that could not be mapped to an Appropriate Use Criteria Indication
Denominator	PCI Procedures
Inclusion Criteria	Data submissions that passed NCDR data inclusion thresholds PCI procedures
Exclusion Criteria	There are no exclusions for this measure
Time period	Four consecutive quarters
Clinical Rationale/ Recommendation	Percutaneous coronary intervention (PCI) Appropriate Use Criteria (AUC) metrics give you feedback on self-assessment of the appropriateness of PCI procedures.
Relevant Citations	Appropriate Use Criteria for Coronary Revascularization Focused Update developed by the ACC, Society for Cardiovascular Angiography and Interventions, Society of Thoracic Surgeons, American Heart Association, and other national societies and published in the Journal of the American College of Cardiology (*J Am Coll Cardiol* 2012;59: 857-81)