



## Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item IM1.1 relates to sub criterion IM1).

### Brief Measure Information

**NQF #:** 3625

**De.2. Measure Title:** Non-Emergent Coronary Artery Bypass Graft (CABG) Measure

**Co.1.1. Measure Steward:** Centers for Medicare & Medicaid Services

**De.3. Brief Description of Measure:** The Non-Emergent CABG episode-based cost measure evaluates a clinician's risk-adjusted cost to Medicare for patients who undergo a CABG procedure during the performance period. The measure score is the clinician's risk-adjusted cost for the episode group averaged across all episodes attributed to the clinician. This procedural measure includes costs of services that are clinically related to the attributed clinician's role in managing care during each episode from 30 days prior to the clinical event that opens, or "triggers," the episode through 90 days after the trigger. Patient populations eligible for the Non-Emergent CABG measure include Medicare beneficiaries enrolled in Medicare Parts A and B.

**IM.1.1. Developer Rationale:** Non-emergent coronary artery bypass graft (CABG) surgeries reflect substantial Medicare expenditures, and are highly prevalent among Medicare beneficiaries. From 2000 to 2012, an average of 100,000 Medicare patients underwent CABG surgery each year, with more than 12% incurring substantial costs from readmissions within 30 days of hospital discharge (i.e., an additional \$13,499 on average). [1][2] Currently, there are significant opportunities to improve both the cost-efficiency and quality of care for CABG surgeries, due to the high variation in related treatment options. Primarily these include the appropriate use of post-acute care (PAC) after discharge, and reducing readmissions from post-surgical complications. [3]

The Non-Emergent CABG episode-based cost measure was recommended for development by an expert clinician committee (the Cardiovascular Disease Management Clinical Subcommittee composed of 46 experts affiliated with 31 specialty societies) because of its impact in terms of patient population and clinician coverage, as well as the opportunity for incentivizing cost-effective, high quality clinical care in this area. Based on the initial recommendations from the Clinical Subcommittee, a subsequent Non-Emergent CABG clinician expert workgroup (composed of 15 members affiliated with 14 specialty societies) provided extensive, detailed input on this measure. Workgroup input has helped ensure the measure's ability to fairly evaluate clinician cost performance for non-emergent CABG surgeries, and promote efficient and high-quality care for Medicare patients undergoing these procedures.

[1] Christian McNeely, Stephen Markwell, and Christina Vassileva. "Trends in Patient Characteristics and Outcomes of Coronary Artery Bypass Grafting in the 2000 to 2012 Medicare Population." *The Annals Of Thoracic Surgery* 102, no. 1 (2016): 132-38.

[2] Rohan M. Shah et al., "Incidence, Cost, and Risk Factors for Readmission After Coronary Artery Bypass Grafting." *The Annals Of Thoracic Surgery* 107, no. 6 (2019): 1789-1790. <https://doi.org/10.1016/j.athoracsur.2018.10.077>.

[3] Lena M. Chen et al., "Spending on Care after Surgery Driven by Choice of Care Settings Instead of Intensity of Services." [In eng]. *Health Aff (Millwood)* 36, no. 1 (Jan 01 2017): 83-90.

**De.1. Measure Type:** Cost/Resource Use

**S.5. Data Source:** Claims

**S.3. Level of Analysis:** Clinician : Group/Practice, Clinician : Individual

**IF Endorsement Maintenance – Original Endorsement Date: Most Recent Endorsement Date:**

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

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

**De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret**

## results?

## Importance to Measure and Report

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

## IM.1. Opportunity for Improvement

## IM.1.1. Briefly explain the rationale for this measure (e.g., the benefits or improvements in performance envisioned by use of this measure)

Non-emergent coronary artery bypass graft (CABG) surgeries reflect substantial Medicare expenditures, and are highly prevalent among Medicare beneficiaries. From 2000 to 2012, an average of 100,000 Medicare patients underwent CABG surgery each year, with more than 12% incurring substantial costs from readmissions within 30 days of hospital discharge (i.e., an additional \$13,499 on average). [1][2] Currently, there are significant opportunities to improve both the cost-efficiency and quality of care for CABG surgeries, due to the high variation in related treatment options. Primarily these include the appropriate use of post-acute care (PAC) after discharge, and reducing readmissions from post-surgical complications. [3]

The Non-Emergent CABG episode-based cost measure was recommended for development by an expert clinician committee (the Cardiovascular Disease Management Clinical Subcommittee composed of 46 experts affiliated with 31 specialty societies) because of its impact in terms of patient population and clinician coverage, as well as the opportunity for incentivizing cost-effective, high quality clinical care in this area. Based on the initial recommendations from the Clinical Subcommittee, a subsequent Non-Emergent CABG clinician expert workgroup (composed of 15 members affiliated with 14 specialty societies) provided extensive, detailed input on this measure. Workgroup input has helped ensure the measure's ability to fairly evaluate clinician cost performance for non-emergent CABG surgeries, and promote efficient and high-quality care for Medicare patients undergoing these procedures.

- [1] Christian McNeely, Stephen Markwell, and Christina Vassileva. "Trends in Patient Characteristics and Outcomes of Coronary Artery Bypass Grafting in the 2000 to 2012 Medicare Population." *The Annals Of Thoracic Surgery* 102, no. 1 (2016): 132-38.
- [2] Rohan M. Shah et al., "Incidence, Cost, and Risk Factors for Readmission After Coronary Artery Bypass Grafting." *The Annals Of Thoracic Surgery* 107, no. 6 (2019): 17891790. <https://doi.org/10.1016/j.athoracsur.2018.10.077>.
- [3] Lena M. Chen et al., "Spending on Care after Surgery Driven by Choice of Care Settings Instead of Intensity of Services." [In eng]. *Health Aff (Millwood)* 36, no. 1 (Jan 01 2017): 83-90.

**IM.1.2. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis.** (This is required for endorsement maintenance. Include mean, stddev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include).

**This information also will be used to address the subcriterion on improvement (U.3.1.) under Usability and Use.**

Performance scores are provided for clinician groups (identified by Tax Identification Number [TIN]) and individual clinicians (identified by a combination of TIN and National Provider Identifier [NPI]) attributed 10 or more Non-Emergent CABG episodes, as identified in Medicare Parts A and B claims data, ending from January 1, 2019, to December 31, 2019. These scores reflect 804 clinician group practices and 2,550 individual practitioners, corresponding to 42,596 episodes of care for 42,595 beneficiaries. Episodes are included from all 50 States and D.C. in the following settings: acute IP hospitals.

## TIN Level Scores

- Mean score: 1.01
- Standard deviation: 0.09
- Min score: 0.78
- Max score: 1.60
- Score IQR: 0.09
- Score deciles:
  - o 10th: 0.93
  - o 20th: 0.95
  - o 30th: 0.97

- o 40th: 0.98
- o 50th: 1.00
- o 60th: 1.02
- o 70th: 1.03
- o 80th: 1.06
- o 90th: 1.11

**TIN-NPI Level Scores**

- Mean score: 1.00
- Standard deviation: 0.08
- Min score: 0.78
- Max score: 1.60
- Score IQR: 0.09
- Score deciles:
  - o 10th: 0.92
  - o 20th: 0.94
  - o 30th: 0.96
  - o 40th: 0.97
  - o 50th: 0.99
  - o 60th: 1.01
  - o 70th: 1.03
  - o 80th: 1.06
  - o 90th: 1.11

**IM.1.3. If no or limited performance data on the measure as specified is reported in IM.1.2., then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.**

N/A

**IM.1.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability.** (This is required for endorsement maintenance. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) **This information also will be used to address the subcriterion on improvement (U.3.1.) under Usability and Use.**

N/A

**IM.1.5. If no or limited data on disparities from the measure as specified is reported in IM.1.4., then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations.**

N/A

**IM.2. Measure Intent**

**IM.2.1. Describe intent of the measure and its components/ Rationale (including any citations) for analyzing variation in resource use in this way.**

The Non-Emergent CABG measure was developed for use in MIPS in the QPP to meet the requirements of the Social Security Act section 1848(r), added by the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). MIPS aims to reward high-value care by measuring clinician performance through four areas: quality, improvement activities, promoting interoperability, and cost. Each category assesses different aspects of care, and the categories are weighted such that they are combined into one composite score. CMS is introducing MIPS Value Pathways (MVPs) as a way to align and connect quality measures, cost measures, and improvement activities across performance categories of MIPS for different specialties or conditions. MVPs aim to provide a holistic assessment of clinician value for a specific type of care to achieve better healthcare outcomes and lower costs for patients. The use of cost measures is required by statute. The purpose of a cost measure as defined by NQF is to assess resource use. To be effective, they should capture costs related to a clinician's care decisions and account for factors outside of their influence.

**Rationale for Measuring Cost through Episode-Based Cost Measures**

The intent of an episode-based cost measure is to assess costs for a particular type of care, such as related to a procedure or the care of a condition. To do this, the measure only includes the cost of services that are clinically related to the role of the attributed

clinician in providing care to a beneficiary. This is a key difference from broad, population-based cost measures such as the MIPS Total Per Capita Cost (TPCC) and Medicare Spending Per Beneficiary (MSPB) Clinician measures, which assess the overall costs of primary and inpatient care, respectively. Episode- and population-based measures complement each other, as they focus on different types of care.

#### Rationale for Measuring Cost of Non-Emergent CABG

Non-emergent CABG surgeries contribute significant Medicare spending and are prevalent in the Medicare population. This is an important area of cost to assess given the frequency of this procedure, the high costs associated with surgery, and the opportunities for clinicians to make care decisions that reduce the likelihood of high costs, as identified through expert stakeholder input and supported by the literature. Primary opportunities for improvement include reducing readmissions due to complications of the procedure and perioperative care and selecting PAC following a CABG surgery.

This measure provides clinician with information about their costs of care that they can use to understand costs associated with their decision-making. Clinicians play an important role in variation in health care expenditures due to their ability to affect the costs associated with this surgery and its related care. [4] An average of approximately 100,000 Medicare patients underwent CABG surgery annually between 2000 and 2012. [5] More than 12% of patients who underwent an isolated CABG surgery are readmitted within 30 days of discharge, contributing additional costs of a median of \$13,499. [6] PAC also contributes to overall costs and cost variation with CABG surgery. A 2017 study that examined PAC spending for FFS Medicare beneficiaries following CABG found that at least half of FFS Medicare beneficiaries who underwent CABG went on to receive PAC services. It also placed hospitals into risk-adjusted quintiles based on their condition-specific, risk-standardized total spending on PAC, with the lowest quintile having the lowest spending and the highest quintile having the highest. The study found that the average spending on PAC services was under \$4,000 for hospitals in the bottom quintile of 90-day PAC episode spending and over \$10,000 for the upper quintile, but after patient-level risk adjustment and price-standardization, the majority of cost variation still remained and was dependent on the type of PAC selected (i.e., inpatient rehabilitation and skilled nursing). [7]

#### Rationale for Use of Claims Data to Measure Cost

- The use of claims data for episode-based cost measures for MIPS is required by MACRA section 101(f).
- There is no additional submission burden, as clinicians must already submit claims for reimbursement.
- Using Medicare Parts A and B claims data allows CMS to evaluate TIN and TIN-NPI cost across all conditions and procedures, resulting in a comprehensive set of data on Non-Emergent CABG cost performance.
- Additionally, the wide reach of Medicare claims data maximizes the impact of the measure, ensuring that the most TINs and TIN-NPIs benefit from the information provided on Non-Emergent CABG cost performance.

[4] David Cutler et al., "Physician Beliefs and Patient Preferences: A New Look at Regional Variation in Health Care Spending," American Economic Journal: Economic Policy 11, no. 1 (February 1, 2019): 192–221, <https://doi.org/10.1257/pol.20150421>.

[5] McNeely, Markwell, Vassileva. "Trends in Patient Characteristics and Outcomes of Coronary Artery Bypass Grafting in the 2000 to 2012 Medicare Population." The Annals Of Thoracic Surgery 102, no. 1 (2016): 132-38.

[6] Shah et al., "Incidence, Cost, and Risk Factors for Readmission After Coronary Artery Bypass Grafting," 1789-1790.

[7] Chen et al., "Spending on Care after Surgery Driven by Choice of Care Settings Instead of Intensity of Services," 83-90.

### Scientific Acceptability of Measure Properties

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

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

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

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

**De.7. Care Setting** (Select all the settings for which the measure is specified and tested):

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

On the QPP Resource Library <https://qpp.cms.gov/resources/resource-library>, refer to PY2021 and Cost category for the “2021 MIPS Cost Information Forms” and “2021 MIPS Cost Measure Code Lists” ZIP files. Open files ending in “-ne-cabg”.

**S.2. Type of resource use measure** (Select the most relevant)

Per episode

**S.3. Level of Analysis** (Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED):

Clinician : Group/Practice, Clinician : Individual

**S.4. Target Population Category** (Check all the populations for which the measure is specified and tested if any):

**S.5. Data Source** (Check ONLY the sources for which the measure is SPECIFIED AND TESTED).

If other, please describe in S.5.1.

Claims

**S.5.1. Data Source or Collection Instrument** (Identify the specific data source or data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.)

The Non-Emergent CABG measure uses Medicare Part A and Part B claims data, which is maintained by the Centers for Medicare & Medicaid Services (CMS). Part A and B claims data are used to build episodes of care, calculate episode costs, and construct risk adjusters. Data from the Medicare Enrollment Database (EDB) are used to determine patient-level exclusions and supplemental risk adjusters, specifically Medicare Parts A, B, and C enrollment; primary payer; disability status; end-stage renal disease (ESRD); patient birth dates; and patient death dates. The risk adjustment model also uses information from the Minimum Data Set (MDS) to account for expected differences in payment for services provided to patients in long-term care via a Long Term Care Indicator variable in risk adjustment.

For measure testing, data from the United States Census Bureau American Census, United States Census Bureau American Community Survey (ACS), and Common Medicare Enrollment (CME) are used in the analyses evaluating social risk factors in risk adjustment.

**S.5.2. Data Source or Collection Instrument Reference** (available at measure-specific Web page URL identified in S.1 OR in the file attached here) (Save file as: S\_5\_2\_DataSourceReference)

<SamplingMethodologySpecificDataSourceAttachment nodeType="0">2020-12-09-codes-list-ne-cabg.xlsx

**S.6. Data Dictionary or Code Table** (Please provide a web page URL or attachment if exceeds 2 pages. NQF strongly prefers URLs. Attach documents only if they are not available on a web page.)

**Data Dictionary:**

URL: The Research Data Assistance Center (ResDAC) maintains the Medicare claims data dictionary available here: <https://www.resdac.org/file-availability-vrdc>. CMS maintains the Medicare Enrollment Database and data dictionary: [edbonline@cms.hhs.gov](mailto:edbonline@cms.hhs.gov)

Please supply the username and password:

Attachment:

**Code Table:**

URL:

Please supply the username and password:

Attachment: [2021-01-08-testing-form-appendix-ne-cabg.xlsx](#)

**Construction Logic**

**S.7.1. Brief Description of Construction Logic**

If applicable, summarize the general approach or methodology to the measure construction. This is most relevant to measures that are part of or rely on the execution of a measure system or applies to multiple measures.

The Non-Emergent CABG measure is the risk-adjusted cost across all episodes attributed to the clinician group (identified by Taxpayer Identification Number, or TIN) or individual clinician (identified by unique combination of Taxpayer Identification Number and National Provider Identifier, or TIN-NPI).

Non-Emergent CABG episodes, which are units or specific instance of the measure for a given patient and clinician or clinician group and are triggered or opened by Current Procedural Terminology / Healthcare Common Procedure Coding System (CPT/HCPCS) codes for a heart artery bypass accompanied by specified Medicare Severity Diagnosis-Related Group (MS-DRG) codes and additional requirements. Specifically, Non-Emergent CABG episodes can be triggered in two ways:

- A procedure code for heart artery bypass, plus two additional requirements: (i) the heart artery bypass procedure code is accompanied by an MS-DRG code for coronary bypass (MS-DRG 231-236), and (ii) no other additional cardiac-related procedure codes occur at the same time as the initial trigger procedure code for heart artery bypass, or
- A procedure code for heart artery bypass, plus three additional requirements: (i) the heart artery bypass procedure code is accompanied by an MS-DRG code for cardiac valve and other major cardiothoracic procedures with and without cardiac cath (MS-DRG 216-221), (ii) the heart artery bypass procedure code is also accompanied by a procedure code for replacement of aortic valve or replacement and enlargement of left lower heart valve (CPT/HCPCS 33405, 33406, 33410, 33411), and (iii) no other additional cardiac-related procedure codes occur at the same time as the initial trigger procedure code for heart artery bypass.

The episode window spans from 30 days prior to the trigger day through 90 days after, and includes costs from certain clinically-related services from Medicare Parts A and B claims during the episode window.[1] Cost figures are standardized to account for differences in Medicare payments for the same service(s) across Medicare providers. Payment standardized costs remove the effect of differences in Medicare payment among health care providers that are the result of differences in regional health care provider expenses measured by hospital wage indexes and geographic price cost indexes (GPCIs) or other payment adjustments such as those for teaching hospitals. This standardization is intended to isolate cost differences that result from healthcare delivery choices, allowing for more accurate resource use comparisons between health care providers. [2] A regression model is applied to estimate the expected cost of each episode for risk adjustment.

The cost measure is calculated as the sum of the ratio of observed to expected payment-standardized cost to Medicare for all Non-Emergent CABG episodes attributed to a clinician or clinician group. The resulting average episode cost ratio is then multiplied by the national average observed episode cost to generate a dollar figure.

[1] Cost is defined by allowed amounts on Medicare claims data, which include both Medicare trust fund payments and any applicable beneficiary deductible and coinsurance amounts. Claims data from Medicare Parts A and B are used to construct the episode-based cost measures.

[2] For more information on payment standardized costs, please refer to the "CMS Price (Payment) Standardization - Basics" and "CMS Price (Payment) Standardization - Detailed Methods" documents posted on the CMS Price (Payment) Standardization Overview page (<https://www.resdac.org/articles/cms-price-payment-standardization-overview>).

**S.7.2. Construction Logic** *(Detail logic steps used to cluster, group or assign claims beyond those associated with the measure's clinical logic.)*

**Step 1. Trigger and Define an Episode**

Non-Emergent CABG episodes are defined by CPT/HCPCS codes on Part B Physician/Supplier (Carrier) claims that open, or trigger, an episode.

The steps for defining an episode for the Non-Emergent CABG episode group are as follows:

- Identify Part B Physician/Supplier claim lines with positive standardized payment that have a trigger code.
- Trigger an episode if all the following conditions are met for an identified Part B Physician/Supplier claim line:
  - o It was billed by a clinician of a specialty that is eligible for the Merit-based Incentive Payment System (MIPS).
  - o It does not have a post-operative modifier code. [3]
  - o It is the highest cost claim line across all claim lines identified in the above bullets and that have any Non-Emergent CABG trigger code billed for the patient on that day. If multiple Part B Physician/Supplier claim lines with a trigger code occur on different days within a concurrent inpatient (IP) stay, an episode will be triggered by the claim line with the earliest expense date during the IP stay.
- Identify episodes that have a concurrent IP stay by identifying the first IP stay with a relevant MS-DRG code for the patient that is concurrent to the expense date for the trigger Part B Physician/Supplier claim line.
- Establish the episode window as follows:
  - o Establish the episode trigger date as the expense date of the trigger claim line identified in the “Trigger an episode” bullet above.
  - o Establish the episode start date as 30 days prior to the episode trigger date.
  - o Establish the episode end date as 90 days after the episode trigger date.

Once a Non-Emergent CABG episode is triggered, the episode is placed into one of the episode sub-groups to enable meaningful clinical comparisons. Sub-groups represent more granular, mutually exclusive and exhaustive patient populations defined by clinical criteria (e.g., information available on the patient’s claims at the time of the trigger). Sub-groups are useful in ensuring clinical comparability so that the corresponding cost measure fairly compares clinicians with a similar patient case-mix.

This cost measure has 2 sub-groups:

- CABG with Concurrent Aortic Valve Replacement
- Isolated CABG

#### Step 2. Attribute Episodes to a Clinician

Once an episode has been triggered and defined, it is attributed to one or more clinicians of a specialty that is eligible for MIPS. Clinicians are identified by TIN-NPI, and clinician groups are identified by TIN. Only clinicians of a specialty that is eligible for MIPS or clinician groups where the triggering clinician is of a specialty that is eligible for MIPS are attributed episodes.

The steps for attributing a Non-Emergent CABG episode are as follows:

- Identify claim lines with positive standardized payment for any trigger codes that occur during the IP stay concurrent with the trigger.
- Designate a TIN-NPI as a main clinician if the following conditions are met:
  - o No assistant modifier code is found on one or more claim lines billed by the clinician.
  - o No exclusion modifier code is found on the same claim line.
- Designate a TIN-NPI as an assistant clinician if the following conditions are met:
  - o The TIN-NPI was not designated as a main clinician.
  - o An assistant modifier code is found.
  - o No exclusion modifier code is found.
- Attribute an episode to any TIN-NPI designated as a main or assistant clinician.
- Attribute episodes to the TIN by aggregating all episodes attributed to NPIs that bill to that TIN. If the same episode is attributed to more than one NPI within a TIN, the episode is attributed only once to that TIN.

#### Step 3. Assign Costs to an Episode and Calculate Total Observed Episode Cost

Services, and their Medicare costs, are assigned to an episode only when clinically related to the attributed clinician’s role in managing patient care during the episode. Assigned services may include treatment and diagnostic services, ancillary items, services directly related to treatment, and those furnished as a consequence of care (e.g., complications, readmissions, unplanned care, and emergency department visits). Unrelated services are not assigned to the episode. For example, the cost of care for a chronic condition that occurs during the episode but is not related to the clinical management of the patient relative to the Non-Emergent CABG would not be assigned.

For the Non-Emergent CABG episode group, only services performed in the following service categories are considered for assignment to the episode costs:

- Emergency Department (ED)

- Outpatient (OP) Facility and Clinician Services
- IP - Medical
- IP - Surgical
- Inpatient Rehabilitation Facility (IRF) - Medical
- Durable Medical Equipment, Prosthetics, Orthotics, and Supplies (DME)
- Home Health (HH)

In addition to service category, service assignment rules may be modified based on the service category in which the service is performed, as listed above. Service assignment rules may also be defined based on specific (i) service information alone or service information combined with diagnosis information, (ii) prior incidence of service, and/or (iii) the timing of the service, as detailed below.

- Services may be assigned to the episode based on the following service information combinations:
    - o High level service code alone
    - o High level service code combined with first 3 digits of the International Classification of Diseases – 10th Revision diagnosis code (3-digit ICD-10 diagnosis code)
    - o High level service code combined with full ICD-10 diagnosis code
    - o High level service code combined with more specific service code
    - o High level service code combined with more specific service code and with 3-digit ICD-10 diagnosis code
    - o High level service code combined with more specific service code and with full ICD-10 diagnosis code
  - Assigned services may be further refined by prior incidence of service or diagnosis:
    - o Services may be assigned unconditionally (regardless of prior incidence of the service in patient's recent claims history).
    - o Services may be assigned if newly occurring.
    - o Services may be assigned in combination with a diagnosis if the service is newly occurring.
    - o Services may be assigned in combination with a diagnosis if the diagnosis is newly occurring.
    - o Services may be assigned in combination with a diagnosis if either the service OR the diagnosis are newly occurring.
    - o Services may be assigned in combination with a diagnosis if both the service AND the diagnosis are newly occurring.
  - Services as defined by the applicable combinations and incidence options above may be assigned with only specific timing:
    - o Services may be assigned based on whether or not the service occurs before the trigger (in the pre-trigger window) and/or after the trigger (in the post-trigger window).
    - o Services may be assigned only if they occur within a particular number of days from the trigger within the episode window, and services may be assigned for a period shorter than the full duration of the episode window.
- The full list of service assignment rules for the Non-Emergent CABG measure can be found on the "Service\_Assignment" tab of the Non-Emergent CABG Measure Codes List file.

The steps for assigning costs are as follows:

- Identify all services on claims with positive standardized payment that occur within the episode window.
- Assign identified services to the episode based on the types of service assignment rules described above.
- Assign skilled nursing facility (SNF) claims based on the following criteria:
  - o Identify SNF claims for which both (i) the SNF claim's qualifying IP stay is the IP stay during which the trigger occurs, if an IP stay is found, and (ii) the SNF claim occurs during the episode window.
  - o For those identified SNF claims, assign the percentage of the claim amount proportional to the portion of the SNF claim that overlaps with the episode window.
- Assign all claims with trigger codes occurring during the trigger day/stay.
- Assign all physician claims and DME claims occurring during concurrent IP stay.
- Assign all IP evaluation and management (E&M) claims during IP stays in the post-trigger window assigned to episode as applicable.
- Sum standardized Medicare allowed amounts for all claims assigned to each episode to obtain the standardized total observed episode cost.

#### Step 4. Exclude Episodes

Before measure calculation, episode exclusions are applied to remove certain episodes from measure score calculation. Certain exclusions are applied across all procedural episode groups, and other exclusions are specific to the Non-Emergent CABG measure, based on consideration of the clinical characteristics of a homogenous patient cohort. The measure-specific exclusions are listed in the "Exclusions" and "Exclusions\_Details" tabs in the Non-Emergent CABG Measure Codes List file (referenced in Section S.1).

The steps for episode exclusion are as follows:

- Exclude episodes from measure calculation if:
  - o The patient has a primary payer other than Medicare for any time overlapping the episode window or 120-day lookback period prior to the trigger day.
  - o The patient was not enrolled in Medicare Parts A and B for the entirety of the lookback period plus episode window, or was enrolled in Part C for any part of the lookback plus episode window.
  - o No main clinician is attributed the episode.
  - o The patient's date of birth is missing.
  - o The patient's death date occurred before the episode ended.
  - o The episode trigger claim was not performed in an IP hospital based on its place of service.
  - o The IP facility is not a short-term stay acute hospital as defined by subsection (d) when an IP stay concurrent with the trigger is found [4].
- Apply measure-specific exclusions, which check the patient's Medicare claims history for certain billing codes (as specified in the Measure Codes List file) that indicate the presence of a particular procedure, condition, or characteristic.

#### Step 5. Estimate Expected Costs through Risk Adjustment

Risk adjustment is used to estimate expected episode costs in recognition of the different levels of care patients may require due to comorbidities, disability, age, and other risk factors. The risk adjustment model includes variables from the CMS Hierarchical Condition Category Version 22 (CMS-HCC V22) 2016 Risk Adjustment Model [5], as well as other standard risk adjustors (e.g., patient age) and variables for clinical factors that may be outside the attributed clinician's reasonable influence. A full list of risk adjustment variables can be found in the "RA" and "RA\_Details" tabs of the Non-Emergent CABG Measure Codes List file (referenced in Section S.1).

Steps for defining risk adjustment variables and estimating the risk adjustment model are as follows:

- Define HCC and episode group-specific risk adjustors using service and diagnosis information found on the patient's Medicare claims history in the 120-day period prior to the episode trigger day for certain billing codes that indicate the presence of a procedure, condition, or characteristic.
- Define other risk adjustors that rely upon Medicare beneficiary enrollment and assessment data as follows:
  - o Identify patients who are originally "Disabled without end-stage renal disease (ESRD)" or "Disabled with ESRD" using the original reason for joining Medicare field in the Medicare beneficiary EDB.
  - o Identify patients with ESRD if their enrollment indicates ESRD coverage, ESRD dialysis, or kidney transplant in the Medicare beneficiary EDB in the lookback period.
  - o Identify patients who have spent at least 90 days in a long-term care institution without having been discharged to the community for 14 days, based on LTC MDS assessment data, during the lookback period.
- Drop risk adjustors that are defined for less than 15 episodes nationally to avoid using very small samples.
- Categorize patients into age ranges using their date of birth information in the Medicare beneficiary EDB. If an age range has a cell count less than 15, collapse this with the next adjacent higher age range category towards the reference category (65-69).
- Include the MS-DRG of the episode's trigger IP stay, if an IP stay is found, as a categorical risk adjustor.
- Run an ordinary least squares (OLS) regression model to estimate the relationship between all the risk adjustment variables and the dependent variable, the standardized observed episode cost, to obtain the risk-adjusted expected episode cost. A separate OLS regression is run for each episode sub-group nationally.
- Winsorize [6] expected costs as follows.
  - o Assign the value of the 0.5th percentile to all expected episode costs below the 0.5th percentile.
  - o Renormalize [7] values by multiplying each episode's winsorized expected cost by the average expected cost, and dividing the resultant value by the average winsorized expected cost.
- Exclude [8] episodes with outliers as follows. This step is performed separately for each sub-group.
  - o Calculate each episode's residual as the difference between the re-normalized, winsorized expected cost computed above and the observed cost.
  - o Exclude episodes with residuals below the 1st percentile or above the 99th percentile of the residual distribution.
  - o Renormalize the resultant expected cost values by multiplying each episode's winsorized expected costs after excluding outliers by the sub-group's average standardized observed cost after excluding outliers, and dividing by the sub-group's average winsorized expected cost after excluding outliers.

#### Step 6. Calculate Measure Scores

Measure scores are calculated for a TIN or TIN-NPI as follows:

- Calculate the ratio of observed to expected episode cost for each episode attributed to the clinician/clinician group.
- Calculate the average ratio of observed to expected episode cost across the total number of episodes attributed to the clinician/clinician group.
- Multiply the average ratio of observed to expected episode cost by the national average observed episode cost to generate a dollar figure representing risk-adjusted average episode cost.

[3] Post-operative modifier codes indicate that a clinician billing the service was not involved in the main procedure but was involved in the post-operative care for that procedure, and as such the post-operative clinician would not be responsible for the trigger.

[4] Only stays at IP facilities that are paid under a short-term stay acute hospital as defined by subsection (d) will be included. Subsection (d) hospitals are hospitals in the 50 states and D.C. other than: psychiatric hospitals, rehabilitation hospitals, hospitals whose inpatients are predominantly under 18 years old, hospitals whose average inpatient length of stay exceeds 25 days, and hospitals involved extensively in treatment for or research on cancer. For details on the identification of these hospitals, please refer to the CMS Certification Number (CCN) definitions for Short-term (General and Specialty) Hospitals facility types in Section 2779A1 of Chapter 2 of the CMS State Operation Manual. (<https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/Downloads/som107c02.pdf>).

[5] CMS uses an HCC risk adjustment model to calculate risk scores. The HCC model ranks diagnoses into categories that represent conditions with similar cost patterns. Higher categories represent higher predicted healthcare costs, resulting in higher risk scores. There are over 9,500 ICD-10-CM codes that map to one or more of the 79 HCC codes included in the CMS-HCC V22 model.

[6] Winsorization aims to limit the effects of extreme values on expected costs. Winsorization is a statistical transformation that limits extreme values in data to reduce the effect of possible outliers. Winsorization of the lower end of the distribution (i.e., bottom coding) involves setting extremely low predicted values below a predetermined limit to be equal to that predetermined limit.

[7] Renormalization is performed after adjustments are made to the episode's expected cost, such as bottom-coding or residual outlier exclusion. This process multiplies the adjusted values by a scalar ratio to ensure that the resulting average is equal to the average of the original value.

[8] This step excludes episodes based on outlier residual values from the calculation and renormalizes the resultant values to maintain a consistent average episode cost level.

**S.7.2a. CONSTRUCTION LOGIC ATTACHMENT or URL:** If needed, attach supplemental documentation (Save file as:

S\_7\_2\_Construction\_Logic). All fields of the submission form that are supplemented within the attachment must include a summary of important information included in the attachment and its intended purpose, including any references to page numbers, tables, text, etc.

URL:

Please supply the username and password:

Attachment:

**S.7.3. Concurrency of clinical events, measure redundancy or overlap, disease interactions** *(Detail the method used for identifying concurrent clinical events, how to manage them, and provide the rationale for this methodology.)*

The Non-Emergent CABG measure includes costs from clinically related Medicare Part A and Part B services that are furnished to a patient during the episode. The measure avoids redundancy or overlap of clinical events by counting each service once within a given episode for the attributed clinician(s).

This measure is designed to allow episodes to overlap with other episodes; overlapping episodes are different episodes that are triggered for the same patient with overlapping episode windows. This approach allows each episode to reflect attributed clinicians' different roles in providing care services throughout a patient's care trajectory and ensures continuous accountability throughout a patient's care. For example, a patient could have a Non-Emergent CABG episode triggered when the attributed clinician performs the procedure, and 80 days later be admitted to hospital for pneumonia unrelated to the CABG procedure, triggering an episode for a different cost measure that is attributed to the hospitalist providing care for pneumonia. Each episode includes only the cost of assigned services (i.e., those that are within the reasonable influence of the attributed clinician) to reflect each attributed clinician's role. In addition, costs are not double counted as the measure calculation is based on the ratio of observed over expected spending for each episode, then averaged across all of an attributed clinician's episodes.

In addition to including isolated CABG procedures, the Non-Emergent CABG measure also includes CABG procedures that occur concurrently with an aortic valve replacement. Isolated CABG versus CABG with concurrent aortic valve replacement episodes are treated differently than Isolated CABG episodes via sub-grouping (or stratification), as CABG with concurrent aortic valve replacement is a more complex and risky procedure. Other than concurrent aortic valve replacement, the Non-Emergent CABG triggering approach limits inclusion of other cardiac-related procedures by requiring no other cardiac-related procedure codes to occur at the same time as the heart artery bypass trigger procedure code.

The measure accounts for disease interactions through its risk adjustment model based on the CMS-HCC V22 2016 model. In addition to the HCCs, the model includes disease interactions (e.g., Cancer \* Immune Disorders). Further details about the risk adjustment model and disease interaction terms are included in Section S.8.6.

**S.7.4. Complementary services** *(Detail how complementary services have been linked to the measure and provide rationale for this methodology.)*

This measure includes the cost of services that are clinically related to the CABG procedure. The rationale for only including specific costs is to ensure that the attributed clinician is evaluated only on his or her performance on services over which they have reasonable influence, or can reasonably influence the frequency or severity. For instance, the cost of sternal wound infection following the CABG procedure is included in a clinician's episode cost if it occurs during the post-trigger period.

These assigned services that have been identified as related to the procedure and within the influence of the attributed clinician were identified based on empirical evidence and detailed clinical input, the latter of which was gathered from clinician experts and broader feedback from stakeholders from the clinician community. The list of assigned services can be found in the "Service\_Assignment" tab of the Measure Codes List linked in Section S.1, the construction logic used to calculate costs of assigned services is described in Step 3 of Section S.7.2, and the stakeholder input processes used to identify and refine these included services is described in Section S.8.3.

**S.7.5. Clinical hierarchies** *(Detail the hierarchy of codes or condition groups used and provide rationale for this methodology.)*

The risk adjustment model for the Non-Emergent CABG measure includes variables from the CMS-HCC V22 2016 Risk Adjustment Model, as well as other standard risk adjusters (e.g., patient age brackets using information in the Medicare beneficiary EDB) and disease interaction terms. The model also includes variables specific to non-emergent CABG, identified through the incorporation of detailed clinical input, for clinical conditions which may influence the procedure complexity, episode cost, and risk of complication. This approach is adopted to ensure sufficient capture of the patient's clinical characteristics prior to the episode and to allow more comprehensive risk adjustment of comorbid factors, such that remaining variation in clinicians' costs to Medicare are limited to costs that clinicians can reasonably influence. Additional information about the risk adjustment model is included in Section S.8.6.

**S.7.6. Missing Data** *(Detail steps associated with missing data and provide rationale for this methodology (e.g., any statistical techniques to impute missing data))*

:

Since CMS uses Medicare claims data to calculate the Non-Emergent CABG cost measure, we expect a high degree of data completeness.

The data fields used to calculate measure (e.g., payment amounts, diagnosis and procedure codes, etc.) are included in all Medicare claims because clinicians only receive payments for complete claims. Additional information regarding the method of testing to identify missing data is available in the Testing Form in Section 2b6.

CMS has in place several auditing programs used to assess overall claims code accuracy, to ensure appropriate billing, and to recoup any overpayments. CMS routinely conducts data analysis to identify potential problem areas and detect fraud, and audits important data fields used in this measure, including diagnosis and procedure codes and other elements that are consequential to payment. Specifically, CMS works with Zone Program Integrity Contractors (ZPICs), and formerly Program Safeguard Contractors (PSCs), to ensure program integrity; the agency also uses Recovery Audit Contractors (RACs) to identify and correct for underpayments and overpayments.

CMS also uses the Comprehensive Error Rate Testing (CERT) Program to ensure that Medicare payments are correct in accordance

with coverage, coding, and billing rules. Between 2005 and 2020, CERT estimates that proper payment, which is payments that met Medicare coverage, coding, and billing rules, ranged from 87.3 to 96.4 percent of total payments each year. The FY 2020 Medicare FFS program proper payment rate (based on data from July 2018-June 2019) was 93.7 percent. [9] CMS continues to perform successful corrective actions and give providers additional education to ensure accurate billing.

To further ensure the completeness and accuracy of data for each beneficiary who opens an episode, the measure excludes episodes where beneficiary date of birth information (an input to the risk adjustment model) cannot be found in the EDB or the beneficiary death date occurs before the episode trigger date (an indication of errant data).

The Non-Emergent CABG measure also excludes episodes where the patient is enrolled in Medicare Part C or has a primary payer other than Medicare in the 120-day lookback period and episode window. In such situations, Medicare Parts A and B claims data may not capture the complete clinical profile for the patient needed to capture the clinical risk of the patient in risk adjustment. Furthermore, Parts A and B claims data may not capture all Medicare resource use if some portion of the patient's care is covered under Medicare Part C. These steps ensure that we have complete claims data for patients included in the Non-Emergent CABG measure.

To ensure claims completeness and inclusion of any corrections, the measure was developed and calculated using data with a three month claims run-out from the end of the performance period.

[9] Comprehensive Error Rate Testing (CERT) Program. "2020 Medicare Fee-for-Service Supplemental Improper Payments Data". Table A6. <https://www.cms.gov/files/document/2020-medicare-fee-service-supplemental-improper-payment-data.pdf>.

**S.7.7. Resource Use Service Categories (Units) (Select all categories that apply)**

Inpatient services: Inpatient facility services

Inpatient services: Evaluation and management

Inpatient services: Procedures and surgeries

Inpatient services: Imaging and diagnostic

Inpatient services: Lab services

Inpatient services: Admissions/discharges

Other inpatient services

Ambulatory services: Outpatient facility services

Ambulatory services: Emergency Department

Ambulatory services: Pharmacy

Ambulatory services: Evaluation and management

Ambulatory services: Procedures and surgeries

Ambulatory services: Imaging and diagnostic

Ambulatory services: Lab services

Other ambulatory services

Durable Medical Equipment (DME)

Other services not listed

See Measure Codes List

See Measure Codes List

See Measure Codes List

**S.7.8. Identification of Resource Use Service Categories (Units)**

*(For each of the resource use service categories selected above, provide the rationale for their selection and detail the method or algorithms to identify resource units, including codes, logic and definitions.)*

The Non-Emergent CABG measure assesses the standardized allowed amounts of services by clinicians during an episode. Services are assigned (and their costs are included in the measure) only when clinically related to the attributed clinician's role in managing patient care during the episode from 30 days prior to the trigger day through 90 days after. The detailed logic conditions (service assignment rules) are included in the "Service\_Assignment" tab of the Measure Codes list file (linked in Section S.1). This identification approach allows the measure to capture the cost of services that can be attributed to the clinician responsible for managing the patient's care before, during, and after the CABG procedure, without capturing the cost of services that are considered clinically unrelated.

**S.7.8a. If needed, provide supplemental resource use service category specifications in either URL (preferred) or as an attachment (Save file as S.7.8a\_RU\_Service\_Categories):**

URL: See URL provided in Section S.1.

Please supply the username and password:

Attachment:

**Clinical Logic**

**S.8.1. Brief Description of Clinical Logic** (Briefly describe your clinical logic approach including clinical topic area, whether or not your account for comorbid and interactions, clinical hierarchies, clinical severity levels and concurrency of clinical events.)

This measure aims to provide actionable information to clinicians performing a Non-Emergent CABG about their resource use within the overall goal of enabling clinicians to provide cost-effective and high-quality care. The clinical logic is constructed to achieve this objective.

Clinical Topic Area: Non-Emergent CABG

Comorbidity and Interactions: The risk adjustment model includes a series of interaction terms between comorbidities and applies a variant of the CMS-HCC V22 risk adjustment model with additional risk adjusters specific to this procedure to capture patient comorbidities.

Clinical Hierarchies: Clinical hierarchies are embedded in the risk adjustment model, based on the CMS-HCC model.

Clinical Severity Levels: This measure has sub-groups (stratifications) to adjust for patients who require a CABG with concurrent aortic valve replacement versus an isolated CABG surgery. It also adjusts for the MS-DRG during the IP stay, accounting for medical severity levels.

Clinical logic for the Non-Emergent CABG measure counts each service once within a given episode for the attributed clinician(s). The measure also only includes services that are clinically related to the procedure defined by service assignment rules, which were specified based on input from the Non-Emergent CABG Clinician Expert Workgroup.

**S.8.2. Clinical Logic** (Detail any clustering and the assignment of codes, including the grouping methodology, the assignment algorithm, and relevant codes for these methodologies.)

The Non-Emergent CABG measure includes the cost of pre-operative and follow-up services, including those that result as a consequence of care, such as wound care, using a service assignment algorithm.

The Non-Emergent CABG cost measure evaluates resource use through the unit of episodes of care. The cost measure episodes are constructed by including the cost of assigned services provided by clinicians and other providers during the episode window, defined as 30 days prior to the episode trigger and 90 days after the trigger. Triggered episodes are attributed to one or more clinicians of a specialty that is eligible for MIPS, where individual clinicians are identified by TIN-NPI and clinician groups are identified by TIN, and the attributed clinician/clinician group renders the trigger CPT/HCPCS services. The episode triggers and assigned services are contained in the Measure Codes List file (see Section S.1. for details), along with codes used to aid in attribution, codes used to identify measure-specific risk adjusters (described in Section S.8.6), and codes used to identify exclusions (described in Section

S.9.1).

The cost measure is calculated as the sum of the ratios of observed to expected costs, multiplied by the national average observed episode cost to generate a dollar figure, and then divided by total number of episodes from the episode group attributed to a clinician. All costs are payment standardized to control for geographic variation in Medicare reimbursement rates. The measure is risk adjusted to account for age and severity of illness. Expected costs are estimated through risk adjustment by using a linear regression model. More details about the risk adjustment model are described in Section S.7.5 and S.8.6.

**S.8.3. Evidence to Support Clinical Logic Described in S.8.2** *Describe the rationale, citing evidence to support the grouping of clinical conditions in the measurement population(s) and the intent of the measure (as described in IM3)*

The clinical logic used in the Non-Emergent CABG measure is informed by literature, empirical data, expert input, and feedback from a range of stakeholders.

Cost measures are intended to help inform clinicians on the costs associated with their decision-making and to incentivize cost-effective, high-quality care. A cost measure offers opportunity for improvement if clinicians can exercise influence on the intensity or frequency of a significant share of costs during the episode, or if clinicians can achieve lower spending and better care quality through changes in clinical practice.

The measure was designed to incorporate extensive expert clinician input into each component of the measure to ensure that it achieves the goal of providing actionable information to clinicians for their performance of a procedure on a cohesive patient cohort. The measure was developed to meet the requirements of MACRA Section 101(f) to create episode-based cost measures. It aligns with CMS meaningful measure area of “patient-focused episode of care” within the overall quality priority of “Make Care Affordable.” The measure includes services that are clinically related to the procedure and within the reasonable influence of the attributed clinician. By including services after the procedure, it aims to improve care coordination throughout a patient’s care trajectory.

An average of approximately 100,000 Medicare patients underwent CABG surgery annually between 2000 and 2012. [10] More than 12% of patients who underwent an isolated CABG surgery are readmitted within 30 days of discharge, contributing additional costs of a median of \$13,499. [11]

The Cardiovascular Disease Management Clinical Subcommittee, composed of 46 experts affiliated with 31 specialty societies, recommended Non-Emergent CABG episode-based cost measure for development because of its impact in terms of patient population and clinician coverage, and the opportunity for incentivizing cost-effective, high-quality clinical care in this area. Based on the initial recommendations from the Clinical Subcommittee, a subsequent Non-Emergent CABG clinician expert workgroup composed of 15 members affiliated with 14 specialty societies provided extensive, detailed input on this measure.

The members reviewed analyses of the utilization and timing of all Medicare Parts A and B services in broad timeframes extending before and after the episode trigger to provide input which services should be included as part of the episode costs. Members also provided clinical input on the particular logic conditions or rules that should be used along with the services, such as requiring additional codes to be present along with the service to ensure clinical relevance, assigning costs for the service if it occurs within a shorter timeframe from the trigger than the overall episode window length, or assigning the service only when accompanied by a particular relevant diagnosis that is newly occurring. Members also reviewed data on frequency and costs associated with sub-populations within the episode group’s patient cohort to inform input on risk adjusters and exclusions.

The draft measure was field tested from October to November 2018 along with several other measures; during this time, stakeholders reviewed the measure specifications, including a list of assigned services and associated logic rules, field test reports containing details of attributed clinician performance, and supplemental documentation. Over 75,000 TIN and TIN-NPI field test reports were available during this time for review and feedback.

During field testing, a National Summary Data Report, later updated to include reliability analyses, was posted along with the measure specifications:

- National Summary Data Report (2018) – this document contains summary data about the Non-Emergent CABG cost measure, along with other episode-based cost measures. These summary statistics supplement the testing analyses contained in this submission: <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and->

APMs/2018-national-summary-data-report.zip filename: 2020-06-05-national-summary-data-report.pdf.

Stakeholder feedback gathered during field testing was summarized into the Field Testing Feedback Summary Report:

- Field Testing Feedback Summary Report (2018) – this document summarizes the feedback received during a stakeholder feedback period during measure development. The Non-Emergent CABG cost measure has been developed with extensive input from the clinician community: <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2019-ft-feedback-summary-report.pdf>.

Feedback gathered during field testing was evaluated by the Non-Emergent CABG clinician expert workgroup and considered in final measure specification refinements.

[10] McNeely, Christian, Stephen Markwell, and Christina Vassileva. "Trends in Patient Characteristics and Outcomes of Coronary Artery Bypass Grafting in the 2000 to 2012 Medicare Population." *The Annals Of Thoracic Surgery* 102, no. 1 (2016): 132-38.

[11] Shah, R.M., Zhang, Q., Chatterjee, S., Cheema, F., Loor, G., Lemaire, G.L., Wall Jr, M.J., Coselli, J.S., Rosengart, T.K., and Ghanta, R.K. "Incidence, Cost, and Risk Factors for Readmission After Coronary Artery Bypass Grafting." *The Annals Of Thoracic Surgery* 107, no. 6 (2019): 1789-1790. <https://doi.org/10.1016/j.athoracsur.2018.10.077>.

**S.8.3a. CLINICAL LOGIC ATTACHMENT or URL: If needed, attach supplemental documentation (Save file as: S\_8\_3a\_Clinical\_Logic). All fields of the submission form that are supplemented within the attachment must include a summary of important information included in the attachment and its intended purpose, including any references to page numbers, tables, text, etc.**

URL: See URL provided in S.1.

Please supply the username and password:

Attachment:

**S.8.4. Measure Trigger and End mechanisms** (*Detail the measure's trigger and end mechanisms and provide rationale for this methodology*)

The Non-Emergent CABG episode window is defined as follows:

- Episode trigger: CPT/HCPCS code for heart artery bypass when accompanied by:
  - o CPT/HCPCS code for heart artery bypass when accompanied by: (i) MS-DRG code for coronary bypass (MS-DRG 231-236) and (ii) no other cardiac-related procedure codes occur at the same time as the trigger procedure code for heart artery bypass, or
  - o CPT/HCPCS code for heart artery bypass when accompanied by: (i) MS-DRG code for cardiac valve and other major cardiothoracic procedures with and without cardiac cath (MS-DRG 216-221), and (ii) accompanied by procedure code for replacement of aortic valve or replacement and enlargement of left lower heart valve (CPT/HCPCS 33405, 33406, 33410, 33411), and (iii) no other cardiac-related procedure codes occur at the same time as the initial trigger procedure code for heart artery bypass.
- Episode trigger date: The expense date of the trigger claim line.
- Episode start date: 30 days prior to episode trigger date.
- Episode end date: 90 days after episode trigger date.

Additionally, the Non-Emergent CABG cost measure must be triggered based on claims data from the acute IP hospital setting only.

The detailed steps for triggering Non-Emergent CABG episodes are in Section S.7.2. The static timing of the episode start and end date are straightforward to ensure that clinicians can easily understand the episode window and construction, which is important for the goal of the measure to provide actionable information to clinicians.

The conditions to trigger episodes and the duration of the episode window were established with input from clinician experts in consideration of the goals of the measure to provide actionable information to clinicians about their resource use for a comparable patient cohort. An initial Draft List of Episode Groups and Trigger Codes was posted in December 2016 incorporating input from a Clinical Committee of more than 70 clinicians from over 50 professional societies. Feedback from a four-month public comment period on that posting was summarized and shared with the clinical experts who used the information from the draft list as a starting

point and took feedback into consideration along with analyses to help inform discussions (e.g., frequency of services over a period of time extending from the trigger date). This measure was field tested in 2018, as discussed further in Section S.8.3. The Non-Emergent CABG clinician expert workgroup took field testing feedback into consideration in making refinements to the measure, including feedback on the category of assigned services and risk adjusters.

**S.8.5. Clinical severity levels** *(Detail the method used for assigning severity level and provide rationale for this methodology)*

Clinical severity levels are embedded in the risk adjustment model, as described in Section S.7.5. The model, which is based on the CMS-HCC model and is described in further detail in Section S.8.6, includes variables indicating a patient's health status at the start of the episode. In addition, the risk adjustment model includes stratifications for the sub-groups of the measure for isolated CABG or CABG with concurrent aortic valve replacement to ensure that these different circumstances are adjusted for separately. The risk adjustment model also adjusts for the MS-DRG of the inpatient stay, accounting for heart artery bypass with complication and comorbidity, with major complication and comorbidity, or without complication and comorbidity/without major complication and comorbidity.

In addition, the risk adjustment model includes status indicator variables for whether the patient qualifies for Medicare through disability or has ESRD. The model also includes an indicator of whether the patient was receiving long-term care as of the start of the episode, defined as 90 days in a long-term care facility without being discharged to community for 14 days, as patients who need to reside in long-term care facilities typically require more intensive care than patients who live in the community. These enrollment and long-term care status variables are non-diagnostic based indicators of severity of illness.

**S.8.6. Comorbid and interactions** *(Detail the treatment of co-morbidities and disease interactions and provide rationale for this methodology.)*

The Non-Emergent CABG cost measure accounts for comorbid conditions and interactions by broadly following the CMS-HCC risk-adjustment methodology, which is derived from Medicare Part A and B claims and is used in the Medicare Advantage (MA) program. The Non-Emergent CABG model includes 79 HCC indicators used in the CMS-HCC V22 2016 model, derived from diagnoses from the patient's Part A and B claims during the 120-day period prior to the episode trigger date, a period that measures conditions that most directly impact patients' health status at the time of the procedure. Episodes where the patient is not enrolled in both Medicare Part A and Medicare Part B for the 120 days prior to the episode are excluded because information on comorbidities for these patients will be incomplete. When applying the CMS-HCC framework to the measure, expected costs are determined by the risk adjustment model separately for each sub-group, which allows the effect of patient health status and demographics on episode spending levels to vary by the sub-groups which reflect whether or not the patient had a CABG with Concurrent Aortic Valve Replacement surgery or an Isolated CABG surgery.

Because the relationship between comorbidities' episode cost may be non-linear in some cases (i.e., patients may also have more than one disease during a hospitalization episode), the model also takes into account a limited set of interactions between HCCs and/or enrollment status variables as currently used within the CMS-HCC model. The model includes paired-condition interactions such as chronic obstructive pulmonary disease and congestive heart failure, and interactions between conditions and disability status (e.g., disabled and cystic fibrosis). The Non-Emergent CABG risk adjustment methodology includes only a limited set of interaction terms for two reasons. First, inclusion of too many interaction terms will over-fit the model. Second, the risk adjustment methodology broadly follows the established CMS-HCC risk-adjustment methodology, which uses similar interaction terms.

The model also includes patient age categories, patient disability status, patient ESRD status, and recent use of long-term institutional care. Additionally, the model includes variables that expert clinician input identified as being important to account for on top of the clinical characteristics already defined via the HCCs, including antiplatelet therapy, anticoagulant use, smoking, and recent myocardial infarction or percutaneous coronary intervention. The full list of variables used in the risk adjustment model can be found in the Measure Codes List, linked at Section S.1.

**Adjustments for Comparability**

**S.9.1. Inclusion and Exclusion Criteria** *Detail initial inclusion/exclusion criteria and data preparation steps (related to clinical*

*exclusions, claim-line or other data quality, data validation, e.g. truncation or removal of low or high dollar claim, exclusion of ESRD patients)*

:

**Included populations:**

The cohort for this cost measure consists of patients who are Medicare beneficiaries enrolled in Medicare fee-for-service and who undergo a CABG procedure that triggers a Non-Emergent CABG episode. To be included, the patient must have an episode ending within the performance period to ensure that the patient's claims record contains sufficient fee-for-service data both for measuring spending and for risk adjustment purposes.

**Excluded populations:**

Episodes are excluded for data cleaning and completeness reasons, and they are also excluded to ensure comparability by defining a clinically homogenous group of patients. This can help improve the validity of the cost measure by removing sources of variation outside clinician influence and can prevent unintended consequences of measuring clinician cost performance when treating unique patient populations. The following episodes are excluded, with the rationale for each provided below.

- The patient's death date occurred before the episode ended.

Episodes where the patient died are excluded as they may not accurately reflect a clinician's performance. These episodes are unusually high-cost, potentially due to costly complications or end-of-life services prior to death, and may not accurately reflect the efficiency of the attributed clinician.

- Episodes without relevant MS-DRG codes.

A minority of CABG surgeries are represented with alternate MS-DRGs, and these episodes are excluded to limit the measure to only capture admissions where the reason was for a CABG surgery. These episodes are also excluded due to the distinct cost profile and small number of episodes to ensure a clinically comparable patient cohort.

- Episodes where the trigger claim was not in an IP hospital, based on its place of service, as defined by subsection (d) or in an acute hospital in Maryland. [12]

Place of service restriction is a standard exclusion implemented across procedural measures to identify appropriate procedures. Therefore, CABG episodes with trigger claims outside of the appropriate IP setting are excluded given the measure's intent to capture only CABG procedures performed in acute inpatient hospitals.

- Episodes with an emergent CABG procedure.

These patients are sicker with higher costs and rates of complications, including mortality, and so the measure scope focuses only on non-emergent CABG procedures. The variance in costs for this high-risk patient cohort is also higher and would likely not be adequately accounted for by risk adjustment. Therefore, these episodes are excluded to ensure a clinically comparable patient cohort.

- Episodes with a concurrent cox maze procedure.

Episodes with a concurrent cox maze procedure are excluded because these patients require a different set of services and care, in addition to the CABG surgery, to treat atrial fibrillation that would not make their episodes comparable to the overall patient population. Excluding these episodes improves clinical homogeneity of the patient population.

- Episodes in which the patient was on dialysis for ESRD.

Episodes in which the patients have severe kidney disease are excluded because they represent a high-risk patient population with higher complication rates and morbidity.

- Episodes in which the patient was in shock prior to the CABG procedure.

Shock prior to the CABG procedure may indicate that the procedure is more emergent as these patients are sicker, and have higher rates of complications, including mortality. These patients are excluded as this circumstance would likely happen in the emergency department and treatment would not be under the influence of the attributed clinician. Retaining these episodes would put the attributed clinician at risk of having their performance assessed for high cost episodes in which they did not treat or have influence over the patient's care trajectory.

- Episodes with a redo sternotomy.

Episodes where the patient undergoes a redo sternotomy are excluded to ensure that adverse effects caused by the previous

sternotomy do not influence the type of care that the patient will require. Retaining such episodes would put the attributed clinician at risk of being attributed a costly episode (potentially due to treating the complications) where they did not have influence over the procedure/outcomes from the previous sternotomy.

- The patient has a primary payer other than Medicare for any amount of time overlapping the episode window or in the 120 days prior to the episode trigger day.

This population is excluded to ensure that we have complete claims data for patients as there may be other claims (e.g., for services provided under Medicare Part C) that we do not observe in Medicare Parts A and B claims data. Including episodes that do not meet this criterion could potentially misrepresent a clinician's resource use. This exclusion also allows us to accurately construct HCCs for each episode by examining the episode's lookback period without missing claims.

- No attributed clinician is found for the episode.

These episodes are excluded as the measure assesses clinician performance. The measure is intended to assess a homogeneous patient cohort to provide meaningful comparisons between attributed clinicians, so to include these episodes could potentially misrepresent these comparisons.

- The patient's date of birth is missing.

These episodes are excluded as a data cleaning step.

- The patient's death date occurred before the trigger date.

These episodes are excluded as a data cleaning step.

- The patient was not enrolled in Medicare Part A and B for the entirety of the 120-day lookback period plus episode window, or is enrolled in Part C for any part of the lookback period plus episode window.

Similar to above, these episodes are excluded as these patients may receive services not observed in the data. Including these episode could make the attributed clinician appear to have lower cost episodes due to incomplete data.

- Episodes classified as outlier cases.

To account for limitations of risk adjustment, episodes predicted to have expected costs that are substantially different from observed costs are excluded as outliers. Specifically, episodes with residuals from the risk adjustment model below the 1st percentile and above the 99th percentile are considered outliers and removed from measure calculation.

The rationale and testing results for these exclusions are described further in the testing form (Section 2b2).

The Non-Emergent CABG measure applies risk adjustment, statistical exclusions, and renormalization to further ensure comparability, described in Step 5 of the construction methodology in Section S.7.2. The risk adjustment approach accounts for patient level variation prior to the episode trigger. Statistical exclusions and renormalizations are engaged during measure construction after excluding outlier episodes to ensure that distributions resulting from outlier exclusions remain true to population averages.

As with the CMS-HCC model, the risk adjustment approach for this measure uses an ordinary least squares (OLS) linear regression model. The predicted, or expected, cost is winsorized at 0.5th percentile to make sure episodes with unusually small predicted cost, which would lead to abnormally large O/E ratios, do not dominate certain clinicians' final score. The winsorized expected costs are renormalized to ensure the average expected episode cost is the same before and after winsorizing. Then, extremely low- or high-cost outlier episodes with residuals below the 1st percentile or above the 99th percentile are excluded to reduce the effect of these episodes that deviate the most from their expected values in absolute terms. The expected cost after excluding these outliers is again renormalized to ensure that average expected costs are the same after outlier removal.

[12] Subsection (d) covers hospitals in the 50 states and D.C. other than: psychiatric hospitals, rehabilitation hospitals, hospitals whose inpatients are predominantly under 18 years old, hospitals whose average inpatient length of stay exceeds 25 days, and hospitals involved extensively in treatment for or research on cancer.

#### **S.9.2. Risk Adjustment Type** (Select type)

Stratification by risk category/subgroup

If other:

**S.9.3. Stratification Details/Variables** *(All information required to stratify the measure results including the stratification variables, definitions, specific data collection items/responses, code/value sets)*

Differences in case mix are controlled for using an evidence-based statistical risk model with 119 risk factors, including patient health status and clinical factors. The Non-Emergent CABG measure is stratified into two sub-groups:

- CABG with Concurrent Aortic Valve Replacement
- Isolated CABG

By running the risk adjustment model, described below and in Section S.7.2., separately for episodes within each sub-group, the measure accounts for differences in resource use stemming from the type of procedure. This helps ensure that the cost measure is fairly comparing clinicians for CABG overall while preserving clinically meaningful distinctions between the procedure types.

The risk adjustment model for the Non-Emergent CABG measure broadly follows the CMS-HCC risk adjustment methodology, which is derived from Medicare Parts A and B claims and is used in the Medicare Advantage (MA) program. Although the MA risk adjustment model includes 24 age/sex variables, this risk adjustment model does not adjust for sex and so only includes 12 age categorical variables. Severity of illness is measured using HCCs, indicators of enrollment and long-term care status, and disease interactions. The risk adjustment model also includes variables for factors identified by the expert clinician workgroup as affecting resource use.

The model includes 79 HCC indicators derived from the patient's Parts A and B claims during the period 120 days prior to the episode trigger and are specified in the CMS-HCC V22 2016 model. Episodes for patients without a full 120-day lookback period are excluded from the measure. This 120-day period is used to measure patients' health status and ensures that each patient's claims record contains sufficient fee-for-service data for risk adjustment purposes.

In addition, the risk adjustment model includes status indicator variables for whether the patient qualifies for Medicare through Disability or ESRD. The model also includes an indicator of whether the patient recently required long-term care, defined as 90 days in a long-term care facility without being discharged to community for 14 days. Patients who need to reside in long-term care facilities typically require more intensive care than beneficiaries who live in the community. These enrollment and long-term care status variables are non-diagnostic indicators of severity of illness.

The model also accounts for disease interactions between HCCs and/or enrollment status variables included in the MA model. These interactions are included because certain combinations of comorbidities increase costs more than is predicted by the HCC indicators alone. Furthermore, the risk adjustment model includes measure-specific factors intended to further isolate cost variation to those costs that attributed clinicians can reasonably influence. These additional variables were informed by clinical rationale and input from the expert clinician workgroup, empirical evidence of explanatory power over cost variation, and are present at the start of care to focus on clinical characteristics that are likely out of the reasonable sphere of influence of the attributed clinician.

As with the CMS-HCC model, the risk adjustment approach for this measure uses an ordinary least squares (OLS) linear regression model. The predicted, or expected, cost is winsorized at 0.5th percentile to make sure episodes with unusually small predicted cost, which would lead to abnormally large O/E ratios, do not dominate certain clinicians' final score. The winsorized expected costs are renormalized to ensure the average expected episode cost is the same before and after winsorizing. Then, extremely low- or high-cost outlier episodes with residuals below the 1st percentile or above the 99th percentile are excluded to reduce the effect of these episodes that deviate the most from their expected values in absolute terms. The expected cost after excluding these outliers is again renormalized to ensure that average expected costs are the same after outlier removal.

**S.9.4 Costing method**

Detail the costing method including the source of cost information, steps to capture, apply or estimate cost information, and provide rationale for this methodology.

**Standardized pricing**

The methodology used to payment standardize the Medicare claims used to specify this measure is available for download ("CMS Price (Payment) Standardization") from the following URL: <https://www.resdac.org/articles/cms-price-payment-standardization-overview>.

**S.10. Type of score***(Select the most relevant):*

Ratio

If other:

Attachment:

**S.11. Interpretation of Score** *(Classifies interpretation of a ratio score(s) according to whether higher or lower resource use amounts is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score, etc.)*

The Non-Emergent CABG cost measure score is presented as a dollar figure that represents a clinician's average payment-standardized risk-adjusted cost to Medicare across all Non-Emergent CABG episodes attributed to them. A lower measure score indicates that the resource use (observed episode costs) is lower than or similar to expected costs for the care provided for the particular patients and episodes included in the calculation, whereas a higher measure score indicates that the resource use (observed episode costs) is higher than expected for the care provided for the particular patients and episodes included in the calculation.

As a cost measure, this measure on its own does not necessarily by itself reflect quality of care. While it does capture consequences of care by including assigned services during the post-trigger period such as for complications, there are other quality metrics that cannot be captured by a cost measure alone. This measure is most meaningful when presented in part of a program such as MIPS where clinicians are also assessed on quality measures.

**S.12. Detail Score Estimation** *(Detail steps to estimate measure score.)*

As described in Section S.7.2, the Non-Emergent CABG measure score is calculated for each clinician (TIN-NPI) or clinician group (TIN) as follows:

(1) Calculate the ratio of observed to expected episode cost for each episode attributed to the clinician/clinician group.

(2) Calculate the average ratio of observed to expected episode cost across the total number of episodes attributed to the clinician/clinician group.

(3) Multiply the average ratio of observed to expected episode cost by the national average observed episode cost to generate a dollar figure representing risk-adjusted average episode cost.

**Reporting Guidelines**

This section is optional and will be available for users of the measure as guidance for implementation and reporting.

**S.13.1. Describe discriminating results approach**

Detail methods for discriminating differences (reporting with descriptive statistics--e.g., distribution, confidence intervals).

The measure is used in the MIPS Cost Performance Category for the CY 2020 performance period onwards. As such, it has not yet been reported as part of MIPS scoring and will be reported later in 2021. While this measure does capture consequences of care such as complications, there are other quality metrics that cannot be captured by a cost measure alone. As such, this measure is most meaningful when reported as part of a program such as MIPS where clinicians are also assessed on quality measures.

While this measure has not yet been reported as a part of MIPS, we expect that the measure, when reported, will provide clinicians with details about their performance including measure score, average costs, and a supplemental granular patient-level file with additional episode details, similar to the MIPS CY 2019 cost measures that were reported in 2020. Additionally, the clinician community has had opportunities to review and become familiar with the measure. During measure development, we conducted national field testing where confidential reports containing cost measure performance on the Non-Emergent CABG measure at its draft stage of development (and other episode-based cost measures developed at the same time) were available to clinicians and clinician groups meeting a 10-episode case minimum. The purpose of this field testing was to enable clinicians to become familiar with the measure and to provide feedback on the measure specifications for refinement before CMS considered the measure for use in MIPS. During field testing, a National Summary Data Report was also posted containing summary statistics on the episode-based cost measures, including information on the distribution of TIN and TIN-NPI level measure scores.

**S.13.2. Detail attribution approach**

Detail the attribution rules used for attributing resources/costs to providers (e.g., a proportion of total measure cost or frequency of visits during the measure's measurement period) and provide rationale for this methodology.

The Non-Emergent CABG episode is attributed to clinicians (TIN-NPIs) billing the episode trigger code. At the clinician group level, an

episode is attributed to the TIN if its TIN-NPI(s) are attributed an episode by billing the triggering procedure, and all episodes across the TIN's NPI(s) are aggregated. If the same episode is attributed to more than one NPI within a TIN, this episode is only attributed to the TIN once. MIPS allows for participation at both TIN and TIN-NPI level, and so this measure can be reported to both individual clinicians and clinician groups. Empirical results on provider performance (e.g., reliability) for the Non-Emergent CABG measure can be found in the measure testing form (i.e., Section 2a2).

Episodes ending during the performance period are included in a clinician's or clinician group's score. For example, if the performance period is a calendar year, the episode end date (i.e., 90 days after the trigger date) must occur during that calendar year. Requiring episodes to end during the performance period ensures that we have complete claims information for the episode.

#### **S.13.3. Identify and define peer group**

Identify the peer group and detail how peer group is identified and provide rationale for this methodology.

Episodes are opened by the presence of trigger codes on Part B physician/supplier claims, so the clinician peer group is limited to those clinicians performing this procedure. This ensures that clinician cost performance for this procedure is being assessed on a homogeneous patient cohort. While this measure was developed for use in MIPS, it can be expanded to other clinician programs.

#### **S.13.4. Sample size**

Detail the sample size requirements for reporting measure results.

The Non-Emergent CABG measure will be reported for TINs and TIN-NPIs with 10 or more episodes. The measure is used in the Merit-based Incentive Payment System (MIPS) for MIPS performance period 2020 onwards.

#### **S.13.5. Define benchmarking and comparative estimates**

Detail steps to produce benchmarking and comparative estimates and provide rationale for this methodology.

The measure has not been reported yet, as it is being used in the MIPS cost performance category for the 2020 performance period onwards and will be reported later in 2021.

Reporting this measure as part of the cost performance category helps to measure clinicians' resource use for CABG procedures in the Medicare population, and thereby hold clinicians accountable for their cost effectiveness. There is no reporting/data submission requirement. Combined with measures in the other MIPS performance categories, such as the quality performance category, the Non-Emergent CABG measure allows CMS to assess the value of care and incentivize both achievement and improvement in the provision of high-quality, cost-effective care.

**Validity – See attached Measure Testing Submission Form**

#### **SA.1. Attach measure testing form**

[2021-04-26-testing-form-ne-cabg.docx](#)

## **Feasibility**

#### **F.1. Byproduct of Care Processes**

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

##### **F.1.1. Data Elements Generated as Byproduct of Care Processes.**

Generated by and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition

Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims)

If other:

#### **F.2. Electronic Sources**

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

##### **F.2.1. To what extent are the specified data elements available electronically in defined fields (i.e., data elements that are needed**

to compute the performance measure score are in defined, computer-readable fields)

ALL data elements are in defined fields in a combination of electronic sources

**F.2.1a.** If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources.

**F.2.2. If this is an eMeasure,** provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL.

**Attachment:**

**F.3. Data Collection Strategy**

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

**F.3.1. Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.**

Lessons and associated modifications are categorized into three types: data collection procedures, handling of missing data, and data sampling associated with beneficiaries who died before the measurement period.

**Data Collection**

Acumen receives claims data directly from the Common Working File (CWF) maintained at the CMS Baltimore Data Center. Medicare claims are submitted by healthcare providers to a Medicare Administrative Contractor (MAC), and are subsequently added to the CWF. However, these claims may be denied or disputed by the MAC, leading to changes to historical CWF data. In rare circumstances, finalizing claims may take many months, or even years. As a result, it is not practical to wait until all claims for a given month are finalized before calculating this measure. As such, there is a trade-off between efficiency (accessing the data in a timely manner) and accuracy (waiting until most claims are finalized) when determining the length of the time (i.e., the “claims run-out” period) after which to pull claims data. To determine the appropriate claims run-out period, Acumen has performed testing on the delay between claim service dates and claims data finalization. Based on this analysis, Acumen uses a run-out period of three months after the end of the calendar year to collect data for development and testing purposes. MIPS reporting for this cost measure will be done in line with program reporting.

**Missing Data**

This measure requires complete beneficiary information, and episodes with missing data are excluded to ensure completeness of data and accurate comparability across episodes. For example, episodes where the beneficiary was not enrolled in Medicare Parts A and B for the 120 days prior to the episode start date are not included in this measure. This enables the risk adjustment model to adjust accurately for the beneficiary’s comorbidities using data from the previous 120 days of Medicare claims. Additionally, the risk adjustment model includes a categorical variable for beneficiary age bracket, so episodes for which the beneficiary’s date of birth cannot be located are not included in this measure.

**Sampling**

To further ensure data accuracy and completeness of the sample, beneficiaries who die before the episode start date are not included in this measure. These beneficiaries are excluded to ensure that the sample is representative of the patient population who undergo a non-emergent CABG procedure.

**F.3.2. Describe any fees, licensing, or other requirements to use any aspect of the measure as specified (e.g., value/code set, risk model, programming code, and algorithm)?**

N/A

**F.3.3. If there are any fees associated with the use of this measure as specified, attach the fee schedule here. (Save file as: F3\_3\_FeeSchedule)**

**Usability and Use**

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making.

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

**U.1.1. Current and Planned Use**

Specific Plan for Use	Current Use (for current use provide URL)
	<a href="#">Payment Program</a> <a href="#">Quality Payment Program Merit-based Incentive Payment System</a> <a href="https://qpp.cms.gov/mips/overview">https://qpp.cms.gov/mips/overview</a>

**U.1.2. For each CURRENT use, checked above, provide:**

- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included
- Name of program and sponsor: [Quality Payment Program \(QPP\) Merit-based Incentive Payment System \(MIPS\); Centers for Medicare & Medicaid Services.](#)
- Purpose: [The Medicare Access and CHIP Reauthorization Act of 2015 \(MACRA\) established the Quality Payment Program. Under the Quality Payment Program, clinicians are incentivized to provide high-quality and high value care through Advanced Alternate Payment Models \(Advanced APMs\) or MIPS. MIPS eligible clinicians will receive a performance-based payment adjustment to their Medicare payment. This payment adjustment is based on a MIPS final score that assesses evidence-based and practice-specific data across the following categories:](#)
  1. [Quality](#)
  2. [Improvement activities](#)
  3. [Promoting interoperability](#)
  4. [Cost](#)

[As specified in the CY 2020 Physician Fee Schedule final rule \(84 FR 62959 through 62979\), this measure will be implemented as part of MIPS beginning in the 2020 MIPS performance year and 2022 MIPS payment year.](#)

- [Geographic area and number and percentage of accountable entities and patients included:](#)
  - o [U.S.](#)
  - o [The number of clinicians in the QPP varies by performance year. For context, for 2019 there were 954,614 MIPS eligible clinicians receiving a payment adjustment. Of the 954,614 eligible clinicians, 99.99% participated in 2019 with 538,323 clinicians participating in MIPS as individuals or groups and 416,281 clinicians participating in MIPS through APMs. \[8\] As clinicians have choices on how to participate in the Quality Payment Program \(e.g., through MIPS or the Advanced APMs, as groups or individuals\), the exact number and percentage of clinicians who will receive a performance score on this measure are confirmed after the end of each performance period.](#)

[\[8\] CMS, "2019 QPP Participation Results Infographic," Quality Payment Program, https://qpp-cm-prod-content.s3.amazonaws.com/uploads/1190/QPP%202019%20Participation%20Results%20Infographic.pdf.](#)

**U.1.3. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons?** (e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?)

[N/A](#)

**U.1.4. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for**

**implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement.** (*Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.*)

N/A

**U.2.1.1. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation. How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.**

Development: Non-Emergent CABG Clinician Expert Workgroup

During development, Acumen incorporated expert input from the 15 members of the Non-Emergent CABG Clinician Expert Workgroup, who provided detailed feedback on the measure's specifications. Workgroup membership drew from the Cardiovascular Disease Management Clinical Subcommittee membership, which had a public call for nominations, as well as additional clinicians identified through stakeholder outreach. Acumen worked with CMS to compose a balanced workgroup reflecting the Cardiovascular Disease Management Clinical Subcommittee's input on the types of and expertise that would be most relevant to the Non-Emergent CABG episode group and on those who would be most likely to be clinicians who would be attributed the measure, such as thoracic surgeons and cardiac surgeons.

Development: Person and Family Committee

During development, Acumen incorporated person and family engagement input from interviews a pool of patients and caregivers called the Person and Family Committee (PFC). PFC members included Medicare beneficiaries and caregiver/family members of a Medicare beneficiary who have lived experience with health care and/or patient advocacy, health care delivery, concepts of value, and outcomes that are important to patients across delivery/disease/episodes of care. PFC members provided feedback on the (i) selection of episode groups for development, and (ii) a broad set of questions around constructing measures that will provide meaningful feedback on clinicians' resource use via service assignment, provider attribution, and episode length.

Development: Field Testing

Acumen and CMS conducted a national field test of 11 episode-based cost measures and two population-level cost measures, including the Non-Emergent CABG measure, developed during 2018 for a 35-day comment period (October 3, 2018 to November 5, 2018). We provided Non-Emergent CABG Field Test Reports to a sample of eligible clinician groups and clinicians. Each report included information for the Non-Emergent CABG measure if the clinician or clinician group was attributed 10 or more episodes. [9] This testing sample was selected to balance coverage and reliability, since a key goal of field testing was to test the measure with as many stakeholders as possible. The number of field test reports shared with the public was:

- Total reports for all measures: 793,842
- o Total Non-Emergent CABG Field Test Reports: 3,471
- ? TIN reports: 859
- ? TIN-NPI reports: 2,612

All stakeholders, including those who did not receive a field test report, could review a mock field test report that was posted on the CMS website. Other public documentation posted during field testing included: measure specifications (comprising a Draft Cost Measure Methodology document and a Draft Measure Codes List file), a National Summary Data Report, a Frequently Asked Questions document, and a Fact Sheet. [10] During field testing, Acumen conducted education and outreach activities, including a national webinar, office hours with specialty societies, and Help Desk support. Acumen sought feedback on the reports and measure specifications through an online survey, with the option to attach a comment letter.

Implementation: Pre-Rulemaking and Rulemaking

The Non-Emergent CABG measure was implemented in MIPS after going through the pre-rulemaking process and notice-and-comment rulemaking. The measure was submitted to and included in the 2018 Measures Under Consideration (MUC) List. It was then considered by National Quality Forum (NQF)'s Measure Applications Partnership (MAP) Clinician Workgroup and Coordinating Committee in December 2018 and January 2019, respectively.

The measure was proposed for use in the MIPS cost performance category in the CY 2020 Physician Fee Schedule proposed rule. [11] A National Summary Data Report containing information about the measure performance (e.g., measure score distributions by different provider characteristics) was also publicly posted. [12] The Measure Justification Form that provided

results for the testing and evaluation of the Non-Emergent CABG measure was also available. Stakeholders submitted comments on the proposed rule during a 60-day public comment period. CMS considered these comments and finalized the measure for use in MIPS from the CY 2020 performance period onwards in the CY 2020 Physician Fee Schedule final rule. [13]

[9] The field test reports were available for download from the CMS Enterprise Portal:

<https://portal.cms.gov/wps/portal/unauthportal/home/>.

[10] The Measure Development Process, Frequently Asked Questions, and Fact Sheet documents are posted on the MACRA Feedback Page: <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-measure-development-process.pdf>; <https://www.cms.gov/files/zip/macra-2018-field-testing-materials.zip>.

[11] The CY 2020 Physician Fee Schedule proposed rule can be found here:

<https://www.federalregister.gov/documents/2019/08/14/2019-16041/medicare-program-cy-2020-revisions-to-payment-policies-under-the-physician-fee-schedule-and-other>.

[12] CMS, "National Summary Data Report: 11 Episode-Based Cost Measures and Two Revised Cost Measures," (Updated Following Field Testing, June 2019), MACRA Feedback Page, <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-national-summary-data-report.zip>.

[13] The CY 2020 Physician Fee Schedule final rule can be found here:

<https://www.federalregister.gov/documents/2019/11/15/2019-24086/medicare-program-cy-2020-revisions-to-payment-policies-under-the-physician-fee-schedule-and-other>.

**U.2.1.2. Describe the process(es) involved, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.**

Development: Non-Emergent CABG Clinician Expert Workgroup

The workgroup convened for a total of three meetings to review empirical analyses, prepared by the Acumen team, and use their clinical expertise to provide detailed input on each component of the measure. Before each meeting, Acumen provided results from empirical analyses and other background materials for members to review. After each meeting, Acumen administered a survey that members completed as a formal way to record consensus on measure specifications that were discussed.

First, the workgroup met at an all-day in-person meeting in June 2018 to discuss measure specifications for all components of the measure. At this meeting, the workgroup provided detailed input on the following: (i) the codes that will be used to open/trigger episodes, (ii) the length of the episode window, (iii) the sub-groups to compare like patients, (iv) the services whose costs are included in the cost measure, (v) the variables to include in the risk adjustment model, and (vi) the measure exclusion criteria. Members reviewed analyses of the utilization and timing of all Medicare Parts A and B services in broad timeframes extending before and after the episode trigger to provide input which services should be included as part of the episode costs. Members also provided clinical input on the particular logic conditions or rules that should be used along with the services, such as requiring additional codes to be present along with the service to ensure clinical relevance, assigning costs for the service if it occurs within a shorter timeframe from the trigger than the overall episode window length, or assigning the service only when accompanied by a particular relevant diagnosis that is newly occurring. Members also reviewed data on frequency and costs associated with sub-populations within the episode group's patient cohort to inform input on risk adjusters and exclusions.

In August 2018, the workgroup convened for a webinar for follow-up discussions on the episode sub-groups, service assignment, risk adjustment, and exclusions. Members provided feedback on refinements based on testing results for the measure as configured based on input received during the in-person meeting.

After field testing, the workgroup met via webinar in November 2018 to consider stakeholder feedback received during field testing, refine the measure, and review updated testing results. After this final webinar, Acumen prepared the final measure specifications documentation reflecting the updates.

Development: Person and Family Committee

The PFC provided input at two points during the measure development. Initial conversations with the PFC focused on the broad concepts of health care quality and value. Subsequent discussions focused on patient and caregiver perspectives on the types of episodes that should be prioritized for development.

In June 2018, the PFC provided input through interviews on pre- and post-trigger services, attribution of clinicians, and services perceived as aiding recovery or helping to avoid unnecessary costs and complications to understand opportunities for improvement.

This round of PFC input was broken into several buckets of medical treatments, and input related to scheduled surgeries was relevant for the Non-Emergent CABG measure. The input from these discussions was shared with workgroup members for their consideration prior to the workgroup in-person meetings in June 2018.

During the second round of input, PFC members who had specific experience with a non-emergent CABG procedure participated in in-depth interviews. During these interviews, PFC members considered (i) pre- and post-trigger periods and treatment received therein, (ii) services provided by and costs incurred by various clinicians, including those seen before and after the trigger event, (iii) PFC members' perception of value in health care, and (iv) services perceived as aiding recovery or helping to avoid unnecessary costs and complications. The input from these interviews was shared with the workgroup members who considered these findings, alongside stakeholder feedback from a national field testing period (October 2018) and results of testing analyses, in making refinements to the measures at the webinars in November 2018.

#### Development: Field Testing

During the feedback period, 20,443 field test reports across all cost measures, including the Non-Emergent CABG measure, were downloaded by 1,542 clinician groups (TINs) and 18,901 clinicians (TIN-NPIs). Stakeholder comments from field testing were summarized for the workgroup to consider in recommending refinements to the measures based on the testing data and feedback.

The following sections offer more details on the contents of each report and describe the education and outreach efforts associated with the field testing feedback period.

#### Data Provided During Field Testing:

Each Non-Emergent CABG field test report contained the following information:

- The clinician or clinician group's measure score with the national average score and percentile rank
- Breakdown of cost measure score by episode sub-group with the national average score
- Episode cost breakdown by Medicare Setting and Service Category to show the average cost per episode and share of services with the certain service (i.e., outpatient evaluation and management, ancillary, hospital inpatient, emergency room, post-acute care, and all other services)
- Breakdown of service utilization and cost by selected clinical categorizations of the service assignment rules associated with episode costs during the window to show the average cost per episode, as well as frequency and cost of different categories of clinical services that are clinically relevant to the episode groups

A mock field test report was posted on the CMS MACRA Feedback webpage during the field testing period. Along with the field test report, attributed clinicians and clinician groups received an episode-level CSV file that included the risk profile of their attributed episodes.

#### Education and Outreach:

Acumen directly conducted outreach via email to tens of thousands of stakeholders using a stakeholder contact list developed through previous education and outreach and clinician engagement efforts, as well as CMS, QPP, and other available listservs. Examples of the types of emails that were sent include:

- General emails to all our contacts from clinician and healthcare provider organizations. These included contacts we gathered over the course of our measure development work, including contacts directly involved in our work and contacts we compiled from our own research.
- Targeted emails to available contact details linked to a TIN or TIN-NPI that received a field test report.
- Targeted emails to a small number of specialty societies whose members we anticipated would receive a field test report to seek their support in informing their members about field testing.

Acumen and CMS hosted two office hour sessions in October 2018, to provide an overview of field testing to specialty societies, discuss what information their members would be particularly interested in, and answer any questions. Across both office hours sessions, there were 50 attendees.

Acumen and CMS hosted a national field testing webinar on October 9, 2018, to provide an overview of the measures being field tested and the information available for public comment. The webinar consisted of an hour-long presentation, outlining (i) the cost measure development activities, (ii) field testing activities, (iii) how to access and understand the confidential field test reports, and (iv) the contents of the reports. The presentation was followed by a 30-minute Q&A session. [14] There were 381 attendees at this webinar.

An informational post-field testing webinar was held on March 27, 2019, to provide an update on all the measures following field testing. The 60-minute webinar provided an overview of the basics of measure construction, highlighted refinements made after field testing, and provided a summary of testing done on the measures. The presentation was followed by a 30-minute Q&A portion. [15] There were around 400 attendees at this webinar.

#### Implementation: Pre-Rulemaking

There was a public comment period after the release of the MUC list from December 1, 2018, to December 6, 2018, prior to the MAP Clinician Workgroup Meeting. The MAP Clinician Workgroup met on December 12, 2018, to consider measure specifications and testing updates. Following the release of the Clinician Workgroup's preliminary recommendation, the report was open for a public comment period from December 21, 2018, to January 10, 2019. The MAP Coordinating Committee met on January 22-23, 2019, to consider these comments alongside the MAP Clinician Workgroup's recommendation. Both MAP meetings were open to the public.

#### Implementation: Rulemaking

During the public comment period for the proposed rule from August 14, 2019, to September 27, 2019, stakeholders could review the proposed rule language, measure specifications, National Summary Data Report, and Measure Justification Forms when submitting comments. CMS conducted email outreach via its listserv to notify stakeholders about the release of the proposed rule.

[14] CMS, "2018 MACRA Cost Measures Field Testing," Quality Payment Program, [https://qpp-cm-prod-content.s3.amazonaws.com/uploads/442/2018%20MACRA%20Cost%20Measure%20Field%20Testing%20Webinar\\_Slides.pdf](https://qpp-cm-prod-content.s3.amazonaws.com/uploads/442/2018%20MACRA%20Cost%20Measure%20Field%20Testing%20Webinar_Slides.pdf)

[15] CMS, "MACRA Cost Measures Post-Field Testing Webinar," Quality Payment Program, [https://qpp-cm-prod-content.s3.amazonaws.com/uploads/521/MACRA%20Cost%20Measures%20Post%20Field%20Testing%20\\_Slides.pdf](https://qpp-cm-prod-content.s3.amazonaws.com/uploads/521/MACRA%20Cost%20Measures%20Post%20Field%20Testing%20_Slides.pdf).

#### **U.2.2.1. Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1. Describe how feedback was obtained.**

The overarching feedback that was received on measure performance and implementation included comments from Workgroup members, PFC members, and the broader stakeholder community. Workgroup members provided feedback via survey after each meeting about the discussed measure specifications, and completed a final face validity survey about their level of agreement with the measure's ability to provide an accurate reflection of costs, and to distinguish good and poor performance. The broader stakeholder community provided comments during National Field Testing about the measure development components and approach and accessing field test reports and supplemental documentation as well as measure-specific comments. The broader stakeholder community also provided comments during pre-rulemaking and rulemaking processes. The feedback is detailed in sections U2.2.2 and U2.2.3, with references to publicly-available feedback, where appropriate.

#### Development: Non-Emergent CABG Clinician Expert Workgroup

Input from the workgroup was gathered via three post-meeting surveys. 13 out of the 15 members completed the first and second post-meeting surveys, and 9 out of the 15 members completed the third post-meeting survey.

To gather a formal record of the Non-Emergent CABG Measure workgroup's systematic input throughout measure development, workgroup members completed a face validity survey in December 2020 that assessed the measure's ability to fulfill its intent – to meaningfully compare and evaluate clinicians on cost efficiency – based on current specifications. Overall, 9 of the 15 workgroup members completed the face validity survey.

#### Development: Person and Family Committee

In June 2018, 9 PFC members participated in interviews related to medical treatments for scheduled surgeries, including non-emergent CABG procedures. In September-October 2018, detailed interviews were conducted with 5 PFC members with lived experiences related to a non-emergent CABG procedure.

#### Development: Field Testing

In total across measures, Acumen received 67 survey responses and 25 comment letters, including many from specialty societies (e.g., American Medical Association, American College of Surgeons, Society of Thoracic Surgeons) representing large numbers of potentially attributed clinicians.

Survey responses and comment letters were collected via an online survey, which contained questions on the measure

specifications, as well as questions on the reports themselves and supplemental documentation.

Implementation: Pre-Rulemaking

CMS received 2 comments specifically for the Non-Emergent CABG cost measure included in the MUC List released in December 2018. [14] After the MAP Clinician Workgroup meeting in December 2018, there was another public comment period for stakeholders to review their preliminary recommendations. The Non-Emergent CABG measure received 2 comments. These public comment periods were facilitated by NQF. Stakeholders were able to submit their comments via the NQF website.

Implementation: Rulemaking

CMS received 1 specific comment on the Non-Emergent CABG cost measure and another comment related to all episode-based cost measures included in the CY 2020 Physician Fee Schedule proposed rule. Stakeholders could submit comments through the Federal Register website or via mail.

[14] National Quality Forum, "Measure Applications Partnership Clinician Workgroup Discussion Guide," (2018), [http://public.qualityforum.org/MAP/MAP%20Clinician%20Workgroup/2018-2019%20Clinician%20Workgroup%20Archive/MAP\\_Clinician\\_Workgroup\\_Discussion\\_Guide.html#COMMENTMUC2018-140MIPS](http://public.qualityforum.org/MAP/MAP%20Clinician%20Workgroup/2018-2019%20Clinician%20Workgroup%20Archive/MAP_Clinician_Workgroup_Discussion_Guide.html#COMMENTMUC2018-140MIPS).

**U.2.2.2. Summarize the feedback obtained from those being measured.**

Development: Non-Emergent CABG Workgroup

During the November 2018 webinar, the workgroup reviewed the field testing feedback and empirical analyses to revise the measure, and recommended revisions to assigned services and risk adjustors, as described in more detail in U.2.3.

Finally, in the face validity survey, results indicated that there was overall consensus agreement on the measure specifications, and reflected the strength of the measure development process, wherein expert clinicians engaged with the details of measure design to ensure that each component (e.g., triggers, exclusions, assigned services) facilitates valid clinician performance measurement.

Development: Field Testing

The Field Testing Feedback Summary Report presents all feedback gathered during the field testing period. [16] While there were no specific comments received for Non-Emergent CABG, the following list synthesizes some of the key points that were raised more broadly during the field testing feedback period:

- Stakeholders provided cross-cutting feedback on risk adjustment variables (e.g., cognitive and functional status, academic medical centers, and socioeconomic status), attribution methodology, episode windows and assigned services, and alignment with cost and quality.
- Stakeholder engagement and involvement remains an important aspect of the measure development process. Stakeholders expressed appreciation for the opportunity to provide feedback during field testing and for CMS' continued efforts to involve them in the measure development process. Commenters also valued the decision to operationalize previously collected feedback, as demonstrated through the addition of measure-specific workgroups to the development process.
- Field test reports present useful information for understanding clinician performance, though reduced complexity could encourage more clinician participation. Stakeholders praised the presentation and content of the field test reports. However, the complexity of the information presented in the reports was a challenge for some stakeholders.
- Improved supplemental field testing materials are helpful but can be further refined. Some stakeholders found the supplemental field testing materials to be informative and thorough, providing useful information on field testing and the specifications of the cost measures. However, many noted that although the materials are comprehensive, they remain lengthy and complex, and they believe the amount of information provided is too overwhelming to be useful.
- Ample time for review of field testing reports and materials is vital to collecting meaningful stakeholder feedback. Some stakeholders suggested the field testing period 4 be extended or kept open, given the large amount and complexity of the information that was presented.
- Transparent Clinical Subcommittee and measure-specific workgroup selection and voting encourages buy-in from stakeholders. Some stakeholders expressed concern with the selection and voting processes for the Clinical Subcommittees and workgroups, highlighting that a transparent approach to member selection would ensure an appropriate mix of specialties and clinician types.
- Field test report access continues to present challenges for stakeholders. Some stakeholders noted that they faced difficulties creating accounts and downloading their field test reports from the CMS Enterprise Portal and these challenges may have negatively impacted the number of clinicians that were able to participate in field testing. Stakeholders urged CMS to communicate directly with clinicians receiving field test reports and to find an alternative for delivering and accessing the reports.

Implementation: Pre-Rulemaking

The MAP gives feedback on performance measures from a wide variety of perspectives, with representatives including “consumers, businesses and purchasers, laborers, health plans, clinicians and providers, communities and states, and suppliers.”[17] The Clinician Workgroup specifically aims to ensure, “the alignment of measures and data sources to reduce duplication and burden, identify the characteristics of an ideal measure set to promote common goals across programs, and implement standardized data elements.”[18] The MAP voted to conditionally support this measure for rulemaking, conditional on submission to the NQF review and endorsement process.

Implementation: Rulemaking/Public Comment

CMS received comments on the proposed measures during the public comment period for the CY 2020 Physician Fee Schedule proposed rule. Measure-specific comments were received on the measure specifications, which CMS and Acumen review to determine whether changes needed to be made to the measure specifications. For Non-Emergent CABG, CMS received feedback on excluding an aortic valve replacement trigger code and the shortening post-trigger window for services related to stroke. CMS also received comments about the reliability threshold, the cost category weight, and overall actionability of the episode-based cost measures generally.

For more detailed information on the comments received on the measures as part of the proposed rule public comment period, please see the revised cost measures section in the CY 2020 Physician Fee Schedule final rule for a summary of the public comments received along with CMS responses: <https://www.federalregister.gov/documents/2019/11/15/2019-24086/medicare-program-cy-2020-revisions-to-payment-policies-under-the-physician-fee-schedule-and-other>.

[16] CMS, “October-November 2018 Field Testing Feedback Summary Report for MACRA Cost Measures,” (May 2019), MACRA Feedback Page, <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2019-ft-feedback-summary-report.pdf>.

[17] NQF, “Measure Applications Partnership,” [https://www.qualityforum.org/Setting\\_Priorities/Partnership/Measure\\_Applications\\_Partnership.aspx](https://www.qualityforum.org/Setting_Priorities/Partnership/Measure_Applications_Partnership.aspx).

[18] NQF, “MAP Member Guidebook,” (August 2020), <http://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=80515>.

**U.2.2.3. Summarize the feedback obtained from other users.**

Development: Person and Family Committee

During the June 2018 interviews, PFC members provided feedback on the pre-and post-trigger windows and categories of assigned services for scheduled services. For the episode windows, PFC members indicated that (i) an episode should begin when the patient and clinician make the decision to pursue a given treatment plan, (ii) the length of the pre-trigger period should vary based on urgency/severity of the condition and wait times, and (iii) an episode should end when the attributed clinician reports the outcome of the treatment plan to the patient, the patient feels better, and/or the treatment plan ends. For the categories of assigned services, PFC members indicated that (i) services included in the episode should be driven by the treatment plan ordered by the attributed clinician (e.g., imaging, labs) or emergency department personnel, (ii) adherence to the treatment plan aided recovery and prevented complications (e.g., home health care, rehabilitation), and (iii) the use of transitional care services and care coordination improved perceptions of quality care following the procedure (e.g., coordination between home health and primary care providers).

During the September-October 2018 interviews, PFC members provided input on the pre-and post-trigger window services, their care team, and the value and quality of their care. PFC members reported receiving cardiovascular care, such as medications or routine stress tests, from a primary care provider or cardiologist in the pre-trigger period. Following the procedure, many PFC members reported going to outpatient follow-up visits with their surgeon and cardiologist. PFC members also reported receiving cardiac rehabilitation in outpatient and rehabilitation facilities as well as at home with a home health aide. PFC members reported receiving high quality care throughout the episode and noted good communication and coordination between the surgeon and hospital team and outpatient providers. Many PFC members reported working with the surgeon or a nurse about wound care, medications, and ways to avoid or identify a complication, such as a surgical site infection or blood clot. All PFC members reported receiving care from a cardiothoracic surgeon, and many also reported receiving substantial services from other members of the health care team including a cardiologist and/or vascular surgeon.

Implementation: Pre-Rulemaking

The MAP recognized the importance of cost measures to the MIPS program and conditionally supported this measure pending NQF endorsement. MAP noted that CMS and the Cost and Efficiency Standing Committee should continue to evaluate the risk adjustment model of this measure and consider whether there is need to account for social risk factors in the model. MAP also noted that review of the measure should ensure an appropriate attribution methodology and that the measure adequately considers the issue of small numbers. MAP noted ensuring that cost measures truly address factors within a clinician's reasonable influence. MAP noted that cost measures should continue surveillance for unintended consequences such as stinting of care and reduced quality of care. MAP noted that cost measures should be paired with balancing measures (e.g., quality, efficiency, access, and appropriate use measures) as one way to safeguard against these issues. MAP recognized a need for continuous feedback and testing of measures as they are implemented. Finally, MAP noted a need to provide greater education on these measures as well as for greater transparency of the measure specifications and testing results. [19]

[19] NQF, "MAP Clinicians 2019 Considerations for Implementing Measures Final Report," (March 2019), <https://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=89597>.

**U.2.3. Describe how the feedback described in 4a2.2 has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not**

**Development: Person and Family Committee**

Input gathered from both rounds of interviews was shared with workgroup members. Specifically, this input informed the workgroup's discussions about the categories of services to assign in the pre-and post-trigger windows and provider attribution or who was involved in the care team, which are described in more detail below.

The workgroup recommended assigning pre-operative services that were mentioned by the PFC, such as cardiovascular stress tests. The workgroup also recommended assigning post-operative services that PFC members reported receiving, including wound care and post-acute care and rehabilitation (e.g., physical therapy, home health care, inpatient rehabilitative facility care). PFC members reported that their care team mainly included a cardiothoracic surgeon, cardiologists, primary care provider, and sometimes a nurse; PFC member input is supported by testing results showing that thoracic surgeons and cardiac surgeons were the top two most attributed specialties.

**Development: Field Testing**

After completing field testing, Acumen compiled the feedback provided through the survey and comment letters into a measure-specific report, which was then provided to the Non-Emergent CABG workgroup, along with empirical analyses to inform their discussion and evaluation of any refinements needed to ensure that the measure is capturing what it was intended to capture.

While there were no measure-specific comments received for Non-Emergent CABG, the workgroup considered cross-measure feedback, reviewed updated testing results, and discussed pending items from previous webinars, voting to recommend the following refinements, which were implemented [20]:

- Assign the cost for infective endocarditis within 30 days of the trigger in the post trigger period
- Assign home health services if the principal diagnosis of the claim is strongly associated with CABG surgery (e.g., "Encounter for Surgical aftercare Following Surgery on the Circulatory System" and "Chronic Ischemic Heart Disease")
- Assign home health skilled nursing care if the principal diagnosis is strongly associated with CABG surgery whether it occurs in a skilled nursing facility or home health setting
- Assign inpatient rehabilitation facility admissions that have principal diagnoses that are strongly associated with CABG surgery or are potential complications of CABG surgery and are new diagnoses (specifically stroke)
- Add frailty indicators as risk adjusters, including:
  - o Dementia
  - o Home oxygen
  - o Nursing Facility Physician Visits
  - o Outpatient Therapy
  - o Prior HH services
  - o Recent all-cause admission in the 30 days prior to the trigger event
  - o Walking Aid
  - o Wheelchairs

**Implementation: Rulemaking/Public Comment**

During the public comment period for the CY 2020 Physician Fee Schedule proposed rule, stakeholders submitted comments on the

proposed episode-based cost measures. After receiving public comments, CMS reviewed and evaluated the proposed updates. In response to commenter feedback, CMS determined to exclude trigger claims with CPT/HCPCS code 33406 for the replacement of the aortic valve using human donor valve on heart-lung machine, acknowledging that is typically performed in a very different cohort of patients than the majority of Non-Emergent CABG episodes, and that the recommendation is clinically reasonable and keeps the intent of the Non-Emergent CABG workgroup to not evaluate atypical procedures that represent small sub-populations with higher and unpredictable costs.

In response to the stakeholder's second recommendation, Acumen and CMS clarified that stroke readmissions were not included in the measure; inpatient rehabilitation facility (IRF) stays secondary to stroke post-CABG are included in assigned services. Therefore, only stroke costs in the index hospitalization and subsequent rehabilitation are included in the measure. Given that many post-CABG stays complicated by stroke are longer than 7 days, CMS determined to maintain the existing specification and service assignment updates were not implemented for the Non-Emergent CABG measure.

[20] CMS, "October-November 2018 Field Testing Feedback Summary Report for MACRA Cost Measures," (May 2019), MACRA Feedback Page, <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2019-ft-feedback-summary-report.pdf>.

**U.3.1. Progress on Improvement. (Not required for initial endorsement unless available.) Performance results on this measure (current and over time) should be provided in IM.1.2 and IM.1.4.**

Discuss:

- Purpose Progress (trends in performance results)
- Geographic area and number and percentage of accountable entities and patients included

N/A

**U.3.2. If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.**

N/A

**U.4.1. Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.**

N/A. There were no unexpected findings during the development and testing of this measure.

**U.4.2. Please explain any unexpected benefits from implementation of this measure.**

N/A. There were no unexpected findings during the development and testing of this measure.

## Related or Competing Measures

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

### H.1. Relation to Other NQF-endorsed Measures

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

#### H.1.1. List of related or competing measures (selected from NQF-endorsed measures)

#### H.1.2. If related or competing measures are not NQF endorsed please indicate measure title and steward.

N/A. There are no related or competing measures that are non-NQF-endorsed cost measures with the same focus and/or the same target population submitted to NQF or implemented in MIPS.

### H.2. Harmonization

#### H.2.1. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed

<p><b>measure(s):</b>  <b>Are the measure specifications completely harmonized?</b>  <a href="#">No</a></p> <p><b>H.2.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.</b>  <a href="#">N/A</a></p>
<p><b>H.3. Competing Measure(s)</b></p> <p><b>H.3.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):</b>  <b>Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)</b>  <a href="#">N/A. There are no competing NQF-endorsed or non-NQF-endorsed cost measures that address the same measure focus and target population.</a></p>

<p><b>Contact Information</b></p> <p><b>Co.1 Measure Steward (Intellectual Property Owner):</b> <a href="#">Centers for Medicare &amp; Medicaid Services</a>  <b>Co.2 Point of Contact:</b> <a href="#">Ronique, Evans, Ronique.Evans1@cms.hhs.gov, 410-786-3966-</a>  <b>Co.3 Measure Developer if different from Measure Steward:</b> <a href="#">Acumen, LLC</a>  <b>Co.4 Point of Contact:</b> <a href="#">N/A, N/A, macra-cost-measures-info@acumenllc.com, 650-558-8882-</a></p>
<p><b>Additional Information</b></p> <p><b>Ad.1 Workgroup/Expert Panel involved in measure development</b>  List the workgroup/panel members' names and organizations.  Describe the members' role in measure development.  <b>Non-Emergent CABG Clinician Expert Workgroup Members:</b>  <a href="#">Adam Kingeter, American Society of Anesthesiologists</a>  <a href="#">Alice Bell, American Physical Therapy Association</a>  <a href="#">Elizabeth Schulwolf, Society of Hospital Medicine</a>  <a href="#">Ewen Nicol, AMDA - The Society for Post-Acute and Long-Term Care Medicine</a>  <a href="#">Faisal Bakaeen, Society of Thoracic Surgeons</a>  <a href="#">James Blankenship, Society for Cardiovascular Angiography and Interventions</a>  <a href="#">James Scharff, Society of Thoracic Surgeons</a>  <a href="#">Jeff Rich, Society of Thoracic Surgeons</a>  <a href="#">Keith Horvath, Society of Thoracic Surgeons</a>  <a href="#">Martha Radford, American Medical Association</a>  <a href="#">Matthew Elrod, American Physical Therapy Association</a>  <a href="#">Peggy Kalowes, American Heart Association, Cardiovascular Nursing Council</a>  <a href="#">Sanjay Samy, Society of Thoracic Surgeons</a>  <a href="#">Suma Thomas, American College of Cardiology</a>  <a href="#">William Van Decker, American Society of Nuclear Cardiology</a></p> <p>The Non-Emergent CABG workgroup is composed from the larger Cardiovascular Disease Management Clinical Subcommittee. The composition list of the Clinical Subcommittee is included in the Episode-Based Cost Measures Development Process document. [21]</p> <p>[21]CMS, "Measure Development Process," (October 2018), MACRA Feedback Page, <a href="https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-measure-development-process.pdf">https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-measure-development-process.pdf</a></p>
<p><b>Measure Developer/Steward Updates and Ongoing Maintenance</b>  <b>Ad.2 Year the measure was first released:</b></p>

<b>Ad.3 Month and Year of most recent revision:</b> <b>Ad.4 What is your frequency for review/update of this measure?</b> <b>Ad.5 When is the next scheduled review/update for this measure?</b>
<b>Ad.6 Copyright statement:</b> <b>Ad.7 Disclaimers:</b>
<b>Ad.8 Additional Information/Comments:</b>