

NQF-ENDORSED VOLUNTARY CONSENSUS STANDARDS FOR HOSPITAL CARE

Measure Information Form Collected For: CMS Outcome Measures (Claims Based)

Measure Set: CMS CABG Readmission Measure

Set Measure ID #: READM-30-CABG

Performance Measure Name: Hospital 30-day, all cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

Description:

The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30 days from the date of discharge of the index CABG procedure, for patients 18 years and older discharged from the hospital after undergoing a qualifying isolated CABG procedure. The measure was developed using Medicare Fee-for-Service (FFS) patients 65 years and older and was tested in all-payer patients 18 years and older.

Rationale:

A hospital-level, 30-day all-cause unplanned readmission measure will inform healthcare providers about opportunities to improve care and strengthen incentives for quality improvement, particularly for care at the time of transitions (e.g., discharge to home or a skilled nursing facility). Improvements in inpatient care, care coordination and care transitions for this common, costly procedure are likely to reduce costly readmissions.

Type of Measure: Outcome

Improvement Noted As: A decrease in the RSRR

Numerator Statement:

This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we are using this field to define our outcome. The calculation of the rate is defined below under Measure Calculation.

The outcome for this measure is 30-day all-cause unplanned readmission. We define all-cause readmission as an unplanned inpatient admission for any cause within 30 days after the date of discharge from the index admission for patients 18 years and older discharged from the hospital after undergoing isolated CABG surgery. If a patient has one or more unplanned admissions (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission.

Denominator Statement:

This claims-based measure can be used in either of two patient cohorts: (1) patients aged 65 years or older or (2) patients aged 18 years or older. We have tested the measure in both age groups.

The cohort includes admissions for patients who receive a qualifying isolated CABG procedure (see codes below) and with a complete claims history for the 12 months prior to admission. For simplicity of implementation and as testing demonstrated closely correlated patient-level and hospital-level results using models with or without age interaction terms, the only recommended modification to the measure for application to all-payer data sets is replacement of the “Age-65” variable with a fully continuous age variable.

Included Populations:

Admissions for Medicare FFS greater than or equal to 65 years of age discharged from non-federal acute care hospitals, having a qualifying isolated CABG procedure (i.e., CABG surgeries that DO NOT occur concomitantly with excluded procedures or procedure groups such as aortic valve replacement). Please see the tables below for lists of codes that define relevant CABG procedures as well as the concurrent procedure groups that remove patients from being considered as having undergone an “isolated CABG” surgery.

ICD-9-CM codes that define the index CABG procedure:

- 36.1x - Aortocoronary bypass for heart revascularization, not otherwise specified
- 36.11 - (Aorto) coronary bypass of one coronary artery
- 36.12 - (Aorto) coronary bypass of two coronary arteries
- 36.13 - (Aorto) coronary bypass of three coronary arteries
- 36.14 - (Aorto) coronary bypass of four or more coronary arteries
- 36.15 - Single internal mammary- coronary artery bypass
- 36.16 - Double internal mammary- coronary artery bypass
- 36.17 - Abdominal- coronary artery bypass
- 36.19 - Other bypass anastomosis for heart revascularization

Concurrent procedure groups that remove patients from isolated CABG cohort:

| Procedure groups <u>NOT</u> considered “isolated CABG” ¹ : | Rationale |
|---|---|
| <ul style="list-style-type: none"> • Valve procedures • Atrial and/or ventricular septal defects • Congenital anomalies • Other open cardiac procedures • Heart transplants • Aorta or other non-cardiac arterial bypass procedures • Head, neck, intracranial vascular procedures | <ul style="list-style-type: none"> • Represent higher risk population of patients • Aligned with Society of Thoracic Surgery measures (to the extent possible given data limitations) |

¹For full list of codes see Table 1.

CMS FFS beneficiaries with an index hospitalization within an acute care non-federal hospital are included if they have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission to ensure a full year of administrative data for risk-adjustment.

For patients with more than one qualifying admission in a given year, only one admission is randomly selected to include in the cohort (others are excluded). An index admission is the hospitalization considered for the readmission outcome determination.

For patients who are transferred between one acute care hospital and another, the measures consider these multiple contiguous hospitalizations as a single acute episode of care. Unlike other condition-specific readmission measures such as those following hospitalizations for heart failure and pneumonia, readmission for transferred CABG patients is attributed to the hospital that performed the original CABG procedure. This is because transfer to another acute care facility after CABG is most likely due to a complication of the CABG procedure or the peri-operative care the patient received and as such the care provided by the hospital performing the CABG procedure likely dominates readmission risk, even among transferred patients. This viewpoint is supported by the high proportion of CABG readmissions for diagnoses such as heart failure, pleural effusion, and pneumonia and is endorsed by clinical experts. Therefore, for this measure, the readmission outcome is attributed to the hospital performing the first (“index”) CABG, even if this is not the discharging hospital.

ICD-9-CM codes that define the patient cohort:

- 36.1x - Aortocoronary bypass for heart revascularization, not otherwise specified
- 36.11 - (Aorto) coronary bypass of one coronary artery
- 36.12 - (Aorto) coronary bypass of two coronary arteries
- 36.13 - (Aorto) coronary bypass of three coronary arteries
- 36.14 - (Aorto) coronary bypass of four or more coronary arteries
- 36.15 - Single internal mammary- coronary artery bypass
- 36.16 - Double internal mammary- coronary artery bypass
- 36.17 - Abdominal- coronary artery bypass
- 36.19 - Other bypass anastomosis for heart revascularization

Cohort exclusions (excluded admissions):

In order to create a clinically coherent population for risk adjustment and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures).

For all cohorts, hospitalizations are excluded if they meet any of the following criteria.

Hospitalizations for:

- 1) Patients who leave the hospital against medical advice (AMA)

Rationale: We exclude hospitalizations for patients who are discharged AMA because providers did not have the opportunity to deliver full care and prepare the patient for discharge.

- 2) Patients with qualifying CABG procedures subsequent to another qualifying CABG procedure during the measurement period.

Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period very likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. We, therefore, select the first CABG admission for inclusion in the measure and exclude subsequent CABG admissions from the cohort.

For Medicare FFS patients, the measure additionally excludes:

- 3) Patients without at least 30 days post-discharge enrollment in FFS Medicare.

Rationale: We exclude these hospitalizations because the 30-day readmission outcome cannot be assessed in this group.

Admissions not counted as readmissions (“Planned readmissions”):

Planned readmissions are scheduled admissions for elective procedures or for planned care such as chemotherapy or rehabilitation. Because planned readmissions are not necessarily a signal of quality of care, the CABG readmission measure excludes planned readmissions from being considered as an outcome. Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure. This algorithm underwent two rounds of public comment, a validation study using data from a medical record review, and was finalized based upon technical input of 17 surgeons nominated by 9 surgical societies as well as 10 other expert surgeons. Readmissions that included potentially planned procedures with acute diagnoses or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are *not* excluded from the measure outcome as they are not considered planned in this measure.

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

The planned readmission algorithm has three fundamental principles:

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

The planned readmission algorithm uses a flowchart and four tables of specific procedure categories and discharge diagnosis categories to classify readmissions as planned.

Readmissions are considered planned if any of the following occurs during readmission:

1. A procedure is performed that is in one of the procedure categories that are always planned regardless of diagnosis;
2. The principal diagnosis is in one of the diagnosis categories that are always planned; or,
3. A procedure is performed that is in one of the potentially planned procedure categories and the principal diagnosis is not in the list of acute discharge diagnoses.

Risk Adjustment:

The measures adjust for variables (i.e., age, comorbid diseases, and indicators of patient frailty) that are clinically relevant and have strong relationships with the outcome. For each patient, risk-adjustment variables are obtained from inpatient, outpatient, and provider Medicare administrative claims data extending 12 months prior to, and including, the index admission.

The measures adjust for case mix differences among hospitals based on the clinical status of the patient at the time of the index admission. Accordingly, only comorbidities that convey information about the patient at that time or in the 12 months prior, and not complications that arise during the course of the hospitalization, are included in the risk adjustment.

The measures do not adjust for patients' admission source or their discharge disposition (e.g., skilled nursing facility) because these factors are associated with the structure of the healthcare system, not solely patients' clinical comorbidities. Regional differences in the availability of post-acute care providers and practice patterns might exert undue influence on model results.

The final set of risk-adjustment variables included:

| | |
|--------------|---|
| Demographics | Age (per year >65) Gender (Male) |
| Comorbidity | History of Prior CABG or Valve Surgery Cardiogenic Shock Cancer Diabetes and DM complications Protein-Calorie Malnutrition Disorders of Fluid/Electrolyte/Acid-Base Obesity/Disorders of Thyroid, Cholesterol, Lipids Severe Hematological Disorders Dementia or Senility Major Psychiatric Disorders Hemiplegia, Paraplegia, Paralysis, Functional Disability Polyneuropathy Congestive Heart Failure Arrhythmias Stroke Cerebrovascular Disease Vascular or Circulatory Disease Chronic Obstructive Pulmonary Disease Fibrosis of Lung and Other Chronic Lung Disorders Pneumonia Other Lung Disorders End-stage Renal Disease or Dialysis Renal Failure Decubitus Ulcer or Chronic Skin Ulcer |

Full details of the development of the risk-standardization model for this measure are available at: <http://www.qualitynet.org>.

Model Validation:

Hospital-specific risk-standardized readmission estimates derived from this claims-based model were compared to hospital-specific RSRRs based on a model developed using clinical registry data from the Society of Thoracic Surgeons Adult Cardiac Surgery Database. The correlation coefficient of the RSRRs from the claims-based and registry-based models was 0.96.

Data Collection Approach: Medicare administrative claims data

Data Accuracy: The administrative claims data used to calculate the measure are maintained by CMS' Office of Information Services. These data undergo additional quality assurance checks during measure development and maintenance.

Measure Analysis Suggestions: None

Sampling: No

Data Reported As: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

Measure Calculation:

The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for the variance in patient outcomes within and between hospitals. At the patient level, it models the log-odds of hospital readmission within 30 days using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, the approach models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” readmissions to the number of “expected” readmissions at a given hospital, multiplied by the national observed readmission. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted based on the hospital’s performance with its observed case mix, and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows a particular hospital’s performance, given its case mix, to be compared to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected”

number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology reports.

Selected References:

- Drye E, Krumholz H, Vellanky S, Wang Y. Probing New Conditions and Procedures for New Measure Development: Yale New Haven Health Systems Corporation; Center for Outcomes Research and Evaluation.; 2009:1-7.
- Hannan EL, Zhong Y, Lahey SJ, et al. 30-day readmissions after coronary artery bypass graft surgery in New York State. *JACC Cardiovasc Interv.* 2011;4(5):569-576.
- Normand S-LT, Shahian DM. 2007. Statistical and clinical aspects of hospital outcomes profiling. *Stat Sci* 22 (2): 206-226.

Table 1 - Codes used to Identify Non-Isolated CABG Procedures and Not Included in Final Cohort

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|---|-----------|---|
| 0.61 | Percutaneous angioplasty or atherectomy of precerebral (extracranial) vessel(s) | 105 | Head, neck, intracranial vascular procedure |
| 0.62 | Percutaneous angioplasty or atherectomy of intracranial vessel(s) | 11 | Head, neck, intracranial vascular procedure |
| 0.63 | Percutaneous insertion of carotid artery stent(s) | 102 | Head, neck, intracranial vascular procedure |
| 0.64 | Percutaneous insertion of other precerebral (extracranial) artery stent(s) | 6 | Head, neck, intracranial vascular procedure |
| 0.65 | Percutaneous insertion of intracranial vascular stent(s) | 2 | Head, neck, intracranial vascular procedure |
| 32.4x | Lobectomy with segmental resection of adjacent lobes of lung, excludes that with radical dissection [excision] of thoracic structures | 23 | Lobectomy |
| 33.5x | Lung transplant | 20 | Lung Transplant |

* N indicates the number of patients excluded from the CABG cohort

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|---|-----------|------------------|
| 33.6 | Combined heart-lung transplantation | 0 | Lung Transplant |
| 35.00 | Closed heart valvotomy, unspecified valve | 0 | Valve procedures |
| 35.01 | Closed heart valvotomy, aortic valve | 1 | Valve procedures |
| 35.02 | Closed heart valvotomy, mitral valve | 3 | Valve procedures |
| 35.03 | Closed heart valvotomy, pulmonary valve | 0 | Valve procedures |
| 35.04 | Closed heart valvotomy, tricuspid valve | 0 | Valve procedures |
| 35.10 | Open heart valvuloplasty without replacement, unspecified valve | 2 | Valve procedures |
| 35.11 | Open heart valvuloplasty of aortic valve without replacement | 232 | Valve procedures |
| 35.12 | Open heart valvuloplasty of mitral valve without replacement | 3,636 | Valve procedures |
| 35.13 | Open heart valvuloplasty of pulmonary valve without replacement | 9 | Valve procedures |
| 35.14 | Open heart valvuloplasty of tricuspid valve without replacement | 621 | Valve procedures |
| 35.20 | Replacement of unspecified heart valve | 2 | Valve procedures |
| 35.21 | Replacement of aortic valve with tissue graft | 15,503 | Valve procedures |
| 35.22 | Other replacement of aortic valve | 6,554 | Valve procedures |
| 35.23 | Replacement of mitral valve with tissue graft | 2,614 | Valve procedures |
| 35.24 | Other replacement of mitral valve | 1,680 | Valve procedures |
| 35.25 | Replacement of pulmonary valve with tissue graft | 9 | Valve procedures |
| 35.26 | Other replacement of pulmonary valve | 4 | Valve procedures |
| 35.27 | Replacement of tricuspid valve with tissue graft | 47 | Valve procedures |
| 35.28 | Other replacement of tricuspid valve | 53 | Valve procedures |

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|---|-----------|---------------------------|
| 35.31 | Operations on papillary muscle | 10 | Valve procedures |
| 35.32 | Operations on chordae tendineae | 75 | Valve procedures |
| 35.33 | Annuloplasty | 3,189 | Valve procedures |
| 35.34 | Infundibulectomy | 0 | Valve procedures |
| 35.35 | Operations on trabeculae carneae cordis | 1 | Valve procedures |
| 35.39 | Operations on other structures adjacent to valves of heart | 53 | Valve procedures |
| 35.41 | Enlargement of existing atrial septal defect | 2 | Atrial Septal Defect |
| 35.42 | Creation of septal defect in heart | 1 | Atrial Septal Defect |
| 35.50 | Repair of unspecified septal defect of heart with prosthesis | 0 | Atrial Septal Defect |
| 35.51 | Repair of atrial septal defect with prosthesis, open technique | 36 | Atrial Septal Defect |
| 35.52 | Repair of atrial septal defect with prosthesis, closed technique | 32 | Atrial Septal Defect |
| 35.53 | Repair of ventricular septal defect with prosthesis, open technique | 33 | Ventricular Septal Defect |
| 35.54 | Repair of endocardial cushion defect with prosthesis | 2 | Ventricular Septal Defect |
| 35.55 | Repair of ventricular septal defect with prosthesis, closed technique | 0 | Ventricular Septal Defect |
| 35.60 | Repair of unspecified septal defect of heart with tissue graft | 1 | Ventricular Septal Defect |
| 35.61 | Repair of atrial septal defect with tissue graft | 62 | Atrial Septal Defect |
| 35.62 | Repair of ventricular septal defect with tissue graft | 41 | Ventricular Septal Defect |
| 35.63 | Repair of endocardial cushion defect with tissue graft | 5 | Ventricular Septal Defect |
| 35.70 | Other and unspecified repair of unspecified septal defect of heart | 41 | Ventricular Septal Defect |
| 35.71 | Other and unspecified repair of atrial septal defect | 1,101 | Atrial Septal Defect |
| 35.72 | Other and unspecified repair of ventricular septal defect | 60 | Ventricular Septal Defect |

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|--|-----------|------------------------------------|
| 35.73 | Other and unspecified repair of endocardial cushion defect | 6 | Ventricular Septal Defect |
| 35.81 | Total repair of tetralogy of Fallot | 1 | Correction of congenital anomalies |
| 35.82 | Total repair of total anomalous pulmonary venous connection | 4 | Correction of congenital anomalies |
| 35.83 | Total repair of truncus arteriosus | 0 | Correction of congenital anomalies |
| 35.84 | Total correction of transposition of great vessels, not elsewhere classified | 1 | Correction of congenital anomalies |
| 35.91 | Interatrial transposition of venous return | 3 | Correction of congenital anomalies |
| 35.92 | Creation of conduit between right ventricle and pulmonary artery | 0 | Correction of congenital anomalies |
| 35.93 | Creation of conduit between left ventricle and aorta | 7 | Correction of congenital anomalies |
| 35.94 | Creation of conduit between atrium and pulmonary artery | 0 | Correction of congenital anomalies |
| 35.95 | Revision of corrective procedure on heart | 14 | Correction of congenital anomalies |
| 35.96 | Percutaneous valvuloplasty | 7 | Valve procedures |
| 35.98 | Other operations on septa of heart | 2 | Ventricular Septal Defect |
| 35.99 | Other operations on valves of heart | 23 | Other valve procedures |
| 37.31 | Pericardiectomy | 255 | Repair/restoration of pericardium |
| 37.32 | Excision of aneurysm of heart | 430 | Other open cardiac procedures |
| 37.33 | Excision or destruction of other lesion or tissue of heart, open approach | 4,784 | Other open cardiac procedures |
| 37.35 | Partial ventriculectomy | 6 | Other open cardiac procedures |
| 37.51 | Heart transplantation | 1 | Heart transplant |
| 37.52 | Implantation of total internal biventricular heart replacement system | 0 | Heart replacement procedures |
| 37.53 | Replacement or repair of thoracic unit of (total) replacement heart system | 0 | Heart replacement procedures |

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|---|-----------|---|
| 37.54 | Replacement or repair of other implantable component of (total) replacement heart system | 0 | Heart replacement procedures |
| 37.55 | Removal of internal biventricular heart replacement system | 1 | Heart replacement procedures |
| 37.63 | Repair of heart assist system | 12 | Circulatory assist devices (includes VAD) |
| 37.67 | Implantation of cardiomyostimulation system | 0 | Circulatory assist devices (includes VAD) |
| 38.11 | Head and Neck Endarterectomy | 3 | Head, neck, intracranial vascular procedure |
| 38.12 | Endarterectomy, other vessels of head and neck | 2,033 | Head, neck, intracranial vascular procedure |
| 38.14 | Endarterectomy of Aorta | 372 | Aorta or other non-cardiac arterial bypass procedures |
| 38.15 | Thoracic Endarterectomy | 12 | Aorta or other non-cardiac arterial bypass procedures |
| 38.16 | Endarterectomy : Excision of tunica intima of artery to relieve arterial walls thickened by plaque or chronic inflammation. Location includes abdominal arteries excluding abdominal aorta: Celiac, Gastric, Hepatic, Iliac, Mesenteric, Renal, Splenic, Umbi | 12 | Aorta or other non-cardiac arterial bypass procedures |
| 38.17 | Endarterectomy - abdominal veins: Iliac, Portal, Renal, Splenic, Vena cava. | 0 | Aorta or other non-cardiac arterial bypass procedures |
| 38.34 | Resection of vessel with replacement: Angiectomy, excision of aneurysm (arteriovenous), blood vessel (lesion) with anastomosis (4=aorta, abdominal) | 0 | Aorta or other non-cardiac arterial bypass procedures |

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|---|-----------|---|
| 38.42 | Resection of vessel with replacement: Angiectomy, excision of aneurysm with replacement (2= other vessels of head and neck; carotid, jugular) | 4 | Head, neck, intracranial vascular procedure |
| 38.44 | Resection of vessel with replacement, aorta, abdominal | 203 | Aorta or other non-cardiac arterial bypass procedures |
| 38.45 | Resection of vessel with replacement, thoracic vessels | 1,612 | Aorta or other non-cardiac arterial bypass procedures |
| 39.21 | Caval-pulmonary artery anastomosis | 2 | Aorta or other non-cardiac arterial bypass procedures |
| 39.22 | Aorta-subclavian-carotid bypass | 75 | Aorta or other non-cardiac arterial bypass procedures |
| 39.23 | Other intrathoracic vascular shunt or bypass | 4 | Aorta or other non-cardiac arterial bypass procedures |
| 39.24 | Aorta-renal bypass | 2 | Aorta or other non-cardiac arterial bypass procedures |
| 39.25 | Aorta-iliac-femoral bypass | 13 | Aorta or other non-cardiac arterial bypass procedures |
| 39.26 | Other intra-abdominal vascular shunt or bypass | 5 | Aorta or other non-cardiac arterial bypass procedures |
| 39.28 | Extracranial-intracranial (EC-IC) vascular bypass | 0 | Head, neck, intracranial vascular procedure |
| 39.29 | Other (peripheral) vascular shunt or bypass | 151 | Aorta or other non-cardiac arterial bypass procedures |
| 39.71 | Endovascular implantation of graft in abdominal aorta | 69 | Aorta or other non-cardiac arterial bypass procedures |
| 39.72 | Endovascular embolization or occlusion of head and neck vessels | 4 | Head, neck, intracranial vascular procedure |
| 39.73 | Endovascular implantation of graft in thoracic aorta | 82 | Aorta or other non-cardiac arterial bypass procedures |

| EXCLUDE from CABG cohort if 36.1x occurs with any of the following: | Description | N* | Category |
|--|--|-----------|---|
| 39.74 | Endovascular removal of obstruction from head and neck vessel(s) | 22 | Head, neck, intracranial vascular procedure |
| 39.75 | Endovascular embolization or occlusion of vessel(s) of head or neck using bare coils | 0 | Head, neck, intracranial vascular procedure |
| 39.76 | Endovascular embolization or occlusion of vessel(s) of head or neck using bioactive coils | 0 | Head, neck, intracranial vascular procedure |
| 39.79 | Other endovascular procedures on other vessels | 62 | Aorta or other non-cardiac arterial bypass procedures |
| 85.22 | Resection of quadrant of breast | 0 | Mastectomy |
| 85.23 | Subtotal Mastectomy, which excludes quadrant resection (85.22) | 0 | Mastectomy |
| 85.4x | Mastectomy - includes simple/extended simple, unilateral/bilateral, radical/extended radical | 1 | Mastectomy |