NATIONAL QUALITY FORUM

Measure Evaluation 4.1
January 2010

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The sub-criteria and most of the footnotes from the evaluation criteria are provided in Word comments and will appear if your cursor is over the highlighted area (or in the margin if your Word program is set to show revisions in balloons). Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized)**:** Complete all yellow highlighted areas of the form. Evaluate the extent to which each sub-criterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the* sub-criteria *(yellow highlighted areas)*.

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the sub-criterion, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met
C = Completely (unquestionably demonstrated to meet the criterion)
P = Partially (demonstrated to partially meet the criterion)
M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)
N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)
NA = Not applicable (only an option for a few sub-criteria as indicated)

(for NQF staff use) **NQF Review** #: OT1-012-09 **NQF Project:** Patient Outcomes Measures: Phases I and II
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Coronary artery bypass graft (CABG) procedure and postoperative stroke during the hospitalization or within 7 days of discharge.
De.2 **Brief description of measure***:* This measure identifies patients 20 years and older with a coronary artery bypass graft (CABG) procedure who had a postoperative stroke (CVA) during the hospitalization or within seven days of discharge.
1.1-2 **Type of Measure:** outcome De.3 **If included in a composite or paired with another measure, please identify composite or paired measure**
De.4 **National Priority Partners Priority Area:** safety, care coordination De.5 **IOM Quality Domain**: safety, effectiveness De.6 **Consumer Care Need:** Getting Better

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	**NQF Staff**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.* A.1 **Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)?** Yes A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** proprietary measure A.3 **Measure Steward Agreement:** agreement signed and submitted A.4 **Measure Steward Agreement attached:**	**A** **Y**☐ **N**☐

B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** public reporting, quality improvement Payment Incentive, Accountability	**C** Y☐ N☐
D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1**Testing:** No, testing will be completed within 12 months D.2 **Have NQF-endorsed measures been reviewed to identify if there are similar or related measures?** Yes	**D** Y☐ N☐
(for NQF staff use**)** **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. *Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria) **1a. High Impact**	Eval Rating
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** affects large numbers, frequently performed procedure, a leading cause of morbidity/mortality, patient/societal consequences of poor quality, high resource use 1a.2 1a.3 **Summary of Evidence of High Impact:** Stroke is a devastating complication after coronary bypass surgery. In addition to patient morbidity and mortality, there are indirect costs through lost productivity; the direct economic cost of a stroke ranges from $90 000 to $228 000 over a patient's life span (1). Postoperative stroke is the second most common cause of operative mortality (1). The 1999 American College of Cardiology/American Heart Association (ACC/AHA) guidelines indicate that adverse cerebral outcomes are observed in about 6% of patients after bypass surgery (1,2). Reported rates of postoperative cerebral dysfunction range from 0.4% to 13.8% following coronary operations. The ACC/AHA guidelines describe strategies for reducing the risk of postoperative stroke such as an aggressive approach to the management of patients with severely diseased ascending aortas identified by intraoperative echocardiographic imaging, prevention or aggressive management of postoperative atrial fibrillation, delay of bypass surgery in the case of a left ventricular mural thrombus or a recent, preoperative CVA and preoperative carotid screening. Patients should carefully be screened for cerebrovascular disease to help prevent stroke and its associated morbidities. Use of beta-adrenergic	**1a** C☐ P☐ M☐ N☐

antagonists was associated with a lower incidence of stroke in patients undergoing elective CABG (OR=0.45; 95% CI 0.23 to 0.83; p=0.016). Use of antiplatelet agents within 48 hours of surgery is associated with a decreased risk of stroke (OR=0.51, p=0.01). Increased use of beating-heart surgery without cardiopulmonary bypass may lead to a lower prevalence of stroke following cardiac surgery and thus improve patient outcomes (1,2).

1a.4 Citations for Evidence of High Impact: 1. ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery).Circulation 2004;110(14):e340-437.

2. CMS. 2009 Physician Quality Reporting Initiative Measure Specifications Manual for Claims and Registry. Measure 166: Coronary Artery Bypass Graft (CABG): Stroke/Cerebrovascular Accident (CVA)

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure:

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Using a geographically diverse 12 million member benchmark database (this database represents predominately a commercial population less than 65 year of age) the complication rate, as defined in this measure, was 7.5 percent. This indicates an opportunity for care improvement and the value of identifying patients who have experienced a CVA after CABG surgery.

1b.3 Citations for data on performance gap:
Ingenix EBM Connect benchmark results, December 2007

1b.4 Summary of Data on disparities by population group:
not applicable

1b.5 Citations for data on Disparities:

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1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** This measure identifies patients with a serious or life-threatening complication, specifically a CVA, after CABG surgery. It is essential to measure and understand complications from this treatment, particularly since ACC/AHA guidelines describe strategies for reducing postoperative CVA. This measure will identify surgeons or surgical centers that have higher than expected surgical complications. It could also identify high risk patients who could benefit from disease management services. This can result in the following: improved quality of care, reduction of 30-day readmission rates, reduction of preventable ER visits, and facilitation of care coordination in high-risk situations.

1c.2-3. Type of Evidence: other (specify), randomized controlled trial CMS PQRI

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
The 1999 ACC/AHA guidelines describe strategies for reducing the risk of postoperative stroke such as an aggressive approach to the management of patients with severely diseased ascending aortas identified by intraoperative echocardiographic imaging, prevention or aggressive management of postoperative atrial fibrillation, delay of bypass surgery in the case of a left ventricular mural thrombus or a recent, preoperative CVA and preoperative carotid screening. Patients should carefully be screened for cerebrovascular disease to help prevent stroke and its associated morbidities.
Use of beta-adrenergic antagonists was associated with a lower incidence of stroke in patients undergoing

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elective CABG (OR=0.45; 95% CI 0.23 to 0.83; p=0.016). Use of antiplatelet agents within 48 hours of surgery is associated with a decreased risk of stroke (OR=0.51, p=0.01). Increased use of beating-heart surgery without cardiopulmonary bypass may lead to a lower prevalence of stroke following cardiac surgery and thus improve patient outcomes (1). **1c.5 Rating of strength/quality of evidence (***also provide narrative description of the rating and by whom***):** not applicable **1c.6 Method for rating evidence:** **1c.7 Summary of Controversy/Contradictory Evidence:** none **1c.8 Citations for Evidence (***other than guidelines***):** 1. CMS. 2009 Physician Quality Reporting Initiative Measure Specifications Manual for Claims and Registry. Measure 166: Coronary Artery Bypass Graft (CABG): Stroke/Cerebrovascular Accident (CVA) **1c.9 Quote the Specific guideline recommendation (***including guideline number and/or page number***):** not applicable **1c.10 Clinical Practice Guideline Citation:** **1c.11 National Guideline Clearinghouse or other URL:** **1c.12 Rating of strength of recommendation (***also provide narrative description of the rating and by whom***):** **1c.13 Method for rating strength of recommendation** (*If different from* USPSTF system*, also describe rating and how it relates to USPSTF)***:** **1c.14 Rationale for using this guideline over others:**	
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report***, met?** **Rationale:**	**1** **Y☐** **N☐**
2. 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. (evaluation criteria)	Eval Rating
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	**2a-specs** **C☐** **P☐** **M☐** **N☐**
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** evidence of a CVA during the hospitalization or within seven days of discharge **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the*	

numerator):
date of CABG admission date through seven days after date of hospital discharge

2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions***):**
During the following time period: event start date (i.e., date of CABG admission) through event end date (7 days after CABG discharge), did the patient have 1 or more of the services listed below where the diagnosis on the claim is in the diagnosis code sets:
Services code sets:
Professional Encounter (code set PR0107, RV0107)
Facility Event – Confinement/Admission
Facility Event – Emergency Room
Facility Event – Outpatient Surgery
Diagnosis code sets:
Occlusive Vascular Disease (code set DX0110)
Stroke, non-hemorrhagic (code set DX0146)

Code Set	Code Set Description	DX Code	Diagnosis Code Description
DX0110	Occlusive Vascular Disease	433	PRECEREBRAL OCCLUSION*
DX0110	Occlusive Vascular Disease	433.0	BASILAR ARTERY OCCLUSION
DX0110	Occlusive Vascular Disease	433.00	OCL BSLR ART WO INFRCT
DX0110	Occlusive Vascular Disease	433.01	OCL BSLR ART W INFRCT
DX0110	Occlusive Vascular Disease	433.1	CAROTID ARTERY OCCLUSION
DX0110	Occlusive Vascular Disease	433.10	OCL CRTD ART WO INFRCT
DX0110	Occlusive Vascular Disease	433.11	OCL CRTD ART W INFRCT
DX0110	Occlusive Vascular Disease	433.2	VERTEBRAL ART OCCLUSION
DX0110	Occlusive Vascular Disease	433.20	OCL VRTB ART WO INFRCT
DX0110	Occlusive Vascular Disease	433.21	OCL VRTB ART W INFRCT
DX0110	Occlusive Vascular Disease	433.3	MULT PRECEREB OCCLUSION
DX0110	Occlusive Vascular Disease	433.30	OCL MLT BI ART WO INFRCT
DX0110	Occlusive Vascular Disease	433.31	OCL MLT BI ART W INFRCT
DX0110	Occlusive Vascular Disease	433.8	PRECEREB OCCLUSION NEC
DX0110	Occlusive Vascular Disease	433.80	OCL SPCF ART WO INFRCT
DX0110	Occlusive Vascular Disease	433.81	OCL SPCF ART W INFRCT
DX0110	Occlusive Vascular Disease	433.9	PRECEREB OCCLUSION NOS
DX0110	Occlusive Vascular Disease	433.90	OCL ART NOS WO INFRCT
DX0110	Occlusive Vascular Disease	433.91	OCL ART NOS W INFRCT
DX0110	Occlusive Vascular Disease	434	CEREBRAL ARTERY OCCLUS*
DX0110	Occlusive Vascular Disease	434.0	CEREBRAL THROMBOSIS
DX0110	Occlusive Vascular Disease	434.00	CRBL THRMBS WO INFRCT
DX0110	Occlusive Vascular Disease	434.01	CRBL THRMBS W INFRCT
DX0110	Occlusive Vascular Disease	434.1	CEREBRAL EMBOLISM
DX0110	Occlusive Vascular Disease	434.10	CRBL EMBLSM WO INFRCT
DX0110	Occlusive Vascular Disease	434.11	CRBL EMBLSM W INFRCT
DX0110	Occlusive Vascular Disease	434.9	CEREBR ARTERY OCCLUS NOS
DX0110	Occlusive Vascular Disease	434.90	CRBL ART OC NOS WO INFRC
DX0110	Occlusive Vascular Disease	434.91	CRBL ART OCL NOS W INFRC
DX0146	Stroke, non-hemorrhagic	436	CVA

Code Set	Code Set Description	Procedure Code
PR0107	Professional encounter	99201
PR0107	Professional encounter	99202
PR0107	Professional encounter	99203
PR0107	Professional encounter	99204
PR0107	Professional encounter	99205
PR0107	Professional encounter	99211
PR0107	Professional encounter	99212

PR0107 Professional encounter 99213	
PR0107 Professional encounter 99214	
PR0107 Professional encounter 99215	
PR0107 Professional encounter 99217	
PR0107 Professional encounter 99218	
PR0107 Professional encounter 99219	
PR0107 Professional encounter 99220	
PR0107 Professional encounter 99221	
PR0107 Professional encounter 99222	
PR0107 Professional encounter 99223	
PR0107 Professional encounter 99231	
PR0107 Professional encounter 99232	
PR0107 Professional encounter 99233	
PR0107 Professional encounter 99234	
PR0107 Professional encounter 99235	
PR0107 Professional encounter 99236	
PR0107 Professional encounter 99238	
PR0107 Professional encounter 99239	
PR0107 Professional encounter 99241	
PR0107 Professional encounter 99242	
PR0107 Professional encounter 99243	
PR0107 Professional encounter 99244	
PR0107 Professional encounter 99245	
PR0107 Professional encounter 99251	
PR0107 Professional encounter 99252	
PR0107 Professional encounter 99253	
PR0107 Professional encounter 99254	
PR0107 Professional encounter 99255	
PR0107 Professional encounter 99261	
PR0107 Professional encounter 99262	
PR0107 Professional encounter 99263	
PR0107 Professional encounter 99271	
PR0107 Professional encounter 99272	
PR0107 Professional encounter 99273	
PR0107 Professional encounter 99274	
PR0107 Professional encounter 99275	
PR0107 Professional encounter 99281	
PR0107 Professional encounter 99282	
PR0107 Professional encounter 99283	
PR0107 Professional encounter 99284	
PR0107 Professional encounter 99285	
PR0107 Professional encounter 99301	
PR0107 Professional encounter 99302	
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PR0107 Professional encounter 99306	
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PR0107 Professional encounter 99308	
PR0107 Professional encounter 99309	
PR0107 Professional encounter 99310	
PR0107 Professional encounter 99311	
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PR0107 Professional encounter 99318	
PR0107 Professional encounter 99341	

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PR0107 Professional encounter 99381
PR0107 Professional encounter 99382
PR0107 Professional encounter 99383
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PR0107 Professional encounter 99385
PR0107 Professional encounter 99386
PR0107 Professional encounter 99387
PR0107 Professional encounter 99391
PR0107 Professional encounter 99392
PR0107 Professional encounter 99393
PR0107 Professional encounter 99394
PR0107 Professional encounter 99395
PR0107 Professional encounter 99396
PR0107 Professional encounter 99397
PR0107 Professional encounter 99401
PR0107 Professional encounter 99402
PR0107 Professional encounter 99403
PR0107 Professional encounter 99404
PR0107 Professional encounter 99411
PR0107 Professional encounter 99412
PR0107 Professional encounter 99420
PR0107 Professional encounter 99429
PR0107 Professional encounter S0270
PR0107 Professional encounter S0271
PR0107 Professional encounter S0272
PR0107 Professional encounter S0273

Code Set/Code Set Description/Revenue Code
RV0107 Professional encounter 0510
RV0107 Professional encounter 0511
RV0107 Professional encounter 0512
RV0107 Professional encounter 0513
RV0107 Professional encounter 0514
RV0107 Professional encounter 0515
RV0107 Professional encounter 0516
RV0107 Professional encounter 0517
RV0107 Professional encounter 0519
RV0107 Professional encounter 0520
RV0107 Professional encounter 0521
RV0107 Professional encounter 0522
RV0107 Professional encounter 0523
RV0107 Professional encounter 0524
RV0107 Professional encounter 0525
RV0107 Professional encounter 0526
RV0107 Professional encounter 0528
RV0107 Professional encounter 0529
RV0107 Professional encounter 0981
RV0107 Professional encounter 0983

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):**
Patient(s) 20 years of age and older hospitalized for a CABG procedure

2a.5 Target population gender: Female, Male
2a.6 Target population age range: 20 years of age and older

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
365 days before the end of the report period

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
The following criteria must be met for the patient to be included in the measure denominator:

1. The patient must have a CABG event defined as follows:

Note: Build a Single Event from the earliest admission for CABG during the 12 month report period. During the following window of time: 365 days prior to the common report period end date, begin an episode with the earliest claim, where the procedure on the claim is listed below, and the facility event category on the claim is also listed below:
Procedure:
Coronary Artery Bypass Graft (code set PR0224)
Facility Event Category:
Facility Event – Confinement/Admission [Confinement/Admission = Hospitalization]

Then: Set Event End Date equal to the Episode End Date (discharge date) plus 7 days (i.e., POST window)

2. Patient must have been continuously enrolled in Medical benefits throughout the event with no breaks in enrollment.

3. Exclude patients who expired during CABG admission
Exclude patient if the discharge status for the admission is listed below:
Discharge Status:
Patient Status Indicator equal to 20-29 – Expired

4. Exclude patient if the discharge date occurs during the 7 days prior to the report period end date, or on or after the report period end date.

5. The patient's age must be 20 years or older on the Event End Date (i.e., date of hospital discharge plus 7 days)

Code Set	Procedure Code	Procedure Code Descrption
PR0224	36.10	Aortocoronary bypass for heart revascularization, not otherwise specified
PR0224	36.11	(Aorto)coronary bypass of one coronary artery
PR0224	36.12	(Aorto)coronary bypass of two coronary arteries
PR0224	36.13	(Aorto)coronary bypass of three coronary arteries
PR0224	36.15	Single internal mammary-coronary artery bypass
PR0224	36.16	Double internal mammary-coronary artery bypass
PR0224	36.19	Other bypass anastomosis for heart revascularization

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** 1. Exclude patients who died during CABG admission
2. Exclude patient if there is evidence of a preceding CVA

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**

1. Exclude patients who expired during CABG admission
Exclude patient if the discharge status for the admission is listed below:
Discharge Status:
Patient Status Indicator equal to 20-29 – Expired

2. Exclude patient if there is evidence of a preceding CVA
During the following time period: 365 days before the event start date (i.e., date of CABG admission), did the patient have 1 or more of the services listed below where the diagnosis on the claim is in the diagnosis code sets:
Services code sets:
Professional Encounter (code set PR0107, RV0107)
Facility Event – Confinement/Admission
Facility Event – Emergency Room
Facility Event – Outpatient Surgery
Diagnosis code sets:
Occlusive Vascular Disease (code set DX0110)
Stroke, non-hemorrhagic (code set DX0146)
[code sets DX0110, DX0146, PR0107, RV0107 are provided under numerator details]

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**

2a.12-13 Risk Adjustment Type: no risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: rate/proportion
2a.20 Interpretation of Score: better quality = lower score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
1. Exclude members who meet denominator exclusion criteria
2. Assign a YES or NO result to remaining members based on numerator response
2. Rate = YES/[YES+NO]

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Performance results can be compared to results from our geographically diverse 12 million member benchmark database.

2a.23 Sampling (Survey) Methodology *If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate)*:
Not applicable

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Electronic adminstrative data/claims

2a.25 Data source/data collection instrument (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.***):**
ICD-9 codes, CPT codes, revenue codes

2a.26-28 Data source/data collection instrument reference web page URL or attachment:

2a.29-31 Data dictionary/code table web page URL or attachment:

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Individual, Can be measured at all levels, Population: national, Population: regional/network, Population: states, Population: counties or cities, Clinicians: Group, Program: Disease management,

Program: QIO

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital, Long term acute care hospital, nursing home (NH) /Skilled Nursing Facility (SNF), Dialysis Facility, Ambulatory Care: Clinic, Ambulatory Care: Office, Ambulatory Care: Hospital Outpatient

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)***:** Our data sample included a geographically diverse 12 million member benchmark database. The database represents predominately a commercial population less than 65 year of age.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)***:**
Quality assurance of each measure is accomplished through the testing using multiple methods. Types of testing, data samples and volume vary to ensure the integrity of the measure. Rigorous development, analysis and testing processes are deployed for creating measure specifications. Software testing ensures the software is working as designed. Reliability and validity testing of measures is based on differing data samples and volume of members. National benchmarks are created on a large volume set of data representing members throughout the United States. All quality checks for all measure results must have consistent results and meet expected outcomes based on industry knowledge and experience.

Customer Acceptance Testing (CAT) is another important quality process. CAT ensures that the clinical measures are functioning as intended and that they generate accurate results for typical billing patterns. Using actual claims data a team of business analysts, nurses, and health services researchers conducts a detailed analysis of the output. For each clinical condition in the product (e.g., Diabetes Mellitus, Coronary Artery Disease, etc.) there is a set of CAT data with at least 4000 members who satisfy the condition confirmation criteria. This data is extracted from a large (50+ million member) multi-payer benchmark database and contains inpatient, outpatient, pharmacy, and laboratory data. The testing team analyzes claims from individual members and compares the creation of denominators (target population), numerators, and exclusions from this manual review process to output results from the quality measure.

Regression testing is the part of CAT that verifies the reliability of the product across software releases. For a new release the testing team confirms that every unchanged measure produces the same results as in previous releases, accounting for systematic changes to the software (e.g., code updates, logic changes, etc). Regression testing is conducted at multiple points throughout the software development cycle.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)***:**
Within our data sample, 4361 members had CABG surgery during the measurement year. Of these, 1 member was excluded based on age and 586 were excluded based on evidence of a prior CVA. Of the remaining members, 282 had a CVA during the CABG hospitalization or within 7 days of discharge and 3492 did not have evidence of this complication. The overall CVA complication rate was 7.5 percent.

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2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)***:** as above

2c.2 Analytic Method *(type of validity & rationale, method for testing)***:**
Face Validity Testing (FVT) is the final testing step in the software release cycle. One million members are randomly selected from the large multi-payer benchmark database and their claims data is processed through the software. The Medical Director reviews the results to verify that:
1. Prevalence rates for a condition are comparable to nationally published rates
2. Compliance rates for a measure are comparable to the rates reported in the published literature or by

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other national sources (e.g. HEDIS). If no comparable sources are available, the rates are judged based on what is clinically reasonable.
In addition, all results are reviewed for face validity by members of an external physician clinical consultant panel.

Our claims-based measures have been validated using a chart review comparison process. This validation project is summarized below:
Goal: evaluate the reliability of claims-based measure results using chart review as the gold standard
Methods:
The charts of 100 members from two clinics in one city were reviewed. Results from our claims-based measures were compared to information present in the chart. During this process, 726 measures were evaluated.
Results:
The overall error rate was less than 5%. The error rate varied depending on the type of claim required for numerator compliance and is summarized as follows:
o The error rate was highest with medications, with an 11 percent error rate (2/18). From chart review, it was difficult to tell if this represented a real error, a medication sample was provided, or the prescription was never filled).
o The error rate was 4 percent (14/318) for measures that required labs for numerator compliance. It was noted that a claims-based measure approach sometimes identified labs that were missing in chart review.
o The error rate for office visit and specialty appointments was 2 percent (8/390). Of note, administrative claims was more likely than chart review to identify relevant office and specialty visits, particularly for appointments that occurred outside the clinic or network.
o Errors were found related to coding in claims data, not due to the claims-based measures or methodology. These errors were not quantified.

2c.3 Testing Results *(statistical results, assessment of adequacy in the context of norms for the test conducted)***:**
as above

2d. Exclusions Justified

2d.1 Summary of Evidence supporting exclusion(s):
not applicable

2d.2 Citations for Evidence:

2d.3 Data/sample *(description of data/sample and size)***:**

2d.4 Analytic Method *(type analysis & rationale)***:**

2d.5 Testing Results *(e.g., frequency, variability, sensitivity analyses)***:**

2d
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2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 Data/sample *(description of data/sample and size)***:** not applicable

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)***:**

2e.3 Testing Results *(risk model performance metrics)***:**

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:

2e
C☐ P☐ M☐ N☐ NA☐

2f. Identification of Meaningful Differences in Performance 2f.1 **Data/sample from Testing or Current Use** *(description of data/sample and size)*: as above 2f.2 **Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: 2f.3 **Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*:	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods 2g.1 **Data/sample** *(description of data/sample and size)*: 2g.2 **Analytic Method** *(type of analysis & rationale)*: 2g.3 **Testing Results** *(e.g., correlation statistics, comparison of rankings)*:	**2g** C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care 2h.**1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: not applicable 2h.2 **If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:**	**2h** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, **met?** **Rationale:**	*2* C☐ P☐ M☐ N☐
3. USABILITY	
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. (evaluation criteria)	Eval Rating
3a. Meaningful, Understandable, and Useful Information 3a.1 **Current Use:** in use 3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years*): 3a.3 **If used in other programs/initiatives (***If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years***):** Health plans, physicians (individuals and groups), care management, and other vendors/customers are using this on a national level. Some are using this data in public reporting initiatives. **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users*	**3a** C☐ P☐ M☐ N☐

for public reporting and quality improvement) 3a.4 **Data/sample** *(description of data/sample and size)*: Results are summarized and reported by users/customers depending on their business need. Therefore, this is no single public reporting format. 3a.5 **Methods** *(e.g., focus group, survey, QI project)*: 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)*:	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:** NQF 0131 Society of Thoracic Surgeons measure: Stroke/Cerebrovascular Acciden	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
3b. Harmonization If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?** This measure is partially harmonized. It was initially developed using the age criteria and CABG code set specified in the original STS measure endorsed by NQF. The newer version of this STS measure is CMS PQRI measure 166. The CMS measure uses a different age group (age 18 years and older) and a different CABG code set. The measure that we are submitting will be updated as part of routine maintenance in 2010. At that time, we will match the CMS PQRI age criteria and update our CABG code set.	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** The specification for this STS measure, now 2009 CMS PQRI measure 166, uses a registry reporting option only. Our measure was developed to use enriched administrative data. 5.1 **Competing Measures If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), describe why it is a more valid or efficient way to measure quality:**	**3c** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Usability*?	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, **met?** **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Rating
4a. Data Generated as a Byproduct of Care Processes 4a.1-2 **How are the data elements that are needed to compute measure scores generated?** coding/abstraction performed by someone other than person obtaining original information,	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*)	**4b** C☐ P☐ M☐

Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	N☐
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 4d.1 **Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results.** no significant errors are anticipated	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 4e.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/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:** Testing of this measure did not identify any concerns that would cause us to modify our overall logic. Also, customers have not notified us of any concerns about the performance of this measure. As noted above, the CABG code set will be updated in 2010. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** 4e.3 **Evidence for costs:** 4e.4 **Business case documentation:**	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the sub-criteria **for** *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility***, met?** **Rationale:**	**4** C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	Y☐ N☐ A☐
CONTACT INFORMATION	
Co.1 **Measure Steward (Intellectual Property Owner)** Co.1 **Organization** Ingenix | 12125 Technology Drive | Eden Prairie | Minnesota | 55344	

Co.2 **Point of Contact**
Kay | Schwebke | kay.schwebke@ingenix.com | 952-833-7154

Measure Developer If different from Measure Steward
Co.3 **Organization**
Ingenix | 12125 Technology Drive | Eden Prairie | Minnesota | 55344

Co.4 **Point of Contact**
Kay | Schwebke | kay.schwebke@ingenix.com | 952-833-7154

Co.5 **Submitter If different from Measure Steward POC**
Kay | Schwebke | kay.schwebke@ingenix.com | 952-833-7154

Co.6 **Additional organizations that sponsored/participated in measure development**

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 **Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.**

NAME & Title	Employer/Position
Alexander, Beth	Pharm D, BCPS Assistant Professor, Augsburg College
Ayenew, Woubeshet, MD	Hennepin Faculty Associates; Hennepin County Medical Center
Becker, Keith, MD	Fairview Medical Center
Betcher, Susan, MD	Allina Medical Clinic
Bruer, Paul, MD	Comprehensive Ophthamology, LLC
Capecchi, Joseph, MD	Allina Medical Clinic
Giesler, Janell, MD	Allina Medical Clinic
Grabowski, Carol, MD	Allina Medical Clinic
Hansen, Calvin, MD	Iowa Health Physicians
Hargrove, Jody, MD	Arthritis and Rheumatology Consultants
Hermann, Richard, MD	Tufts - New England Medical Center
Jemming, Brian, Pharm D	CentraCare Health System
Kohen, Jeffrey, MD	Veterans Affairs Medical Center
McCarthy, Teresa, MD	University of Minnesota, Department of Family Medicine & Community Health
McEvoy, Charlene, MD, MPH	HealthPartners & HealthPartners Research Foundation; Assistant Professor of Medicine, University of Minnesota
McGee, Deanna, Pharm D, BCPS	Retail Pharmacy
Ogle, Kathleen, MD	Hennepin Faculty Associates; Hennepin County Medical Center: Assistant Professor of Medicine, University of Minnesota Medical School
Peter, Kathleen, MD	Park Nicollet Medical Center
Pieper-Bigelow, Christina, MD	Allina Medical Clinic
Redmon, Bruce, MD	University of Minnesota Physicians
Scharpf, Steven, MD	Mountain Valleys Health Centers
Weitz, Carol, MD	Independent

Ad.2 **If adapted, provide name of original measure:**
Ad.3-5 **If adapted, provide original specifications URL or attachment**

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 **Year the measure was first released:** 2006
Ad.7 **Month and Year of most recent revision:** 2007-01
Ad.8 **What is your frequency for review/update of this measure?** every three years at minimum - this measure will be updated in 2010

Ad.9 When is the next scheduled review/update for this measure? 2009-11

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Ad.11 -13 Additional Information web page URL or attachment: Attachment Patient Outcome addendum.doc

Date of Submission (*MM/DD/YY*)**:** 09/15/2009