NATIONAL QUALITY FORUM

National Voluntary Consensus Standards for Imaging Efficiency
Measure Summary

Measure Number: IEP-010-10

Measure Title: Cardiac Imaging for Preoperative Risk Assessment for Non-Cardiac Low-Risk Surgery

Description: *:* This measure calculates the percentage of low-risk, non-cardiac surgeries performed at a hospital outpatient facility with a Stress Echocardiography, SPECT MPI or Stress MRI study performed in the 30 days prior to the surgery at a hospital outpatient facility(e.g., endoscopic, superficial, cataract surgery, and breast biopsy procedures). Results are to be segmented and reported by hospital outpatient facility where the imaging procedure was performed.

Numerator Statement: Number of Stress Echocardiography, SPECT MPI and Stress MRI studies performed at the hospital outpatient facility in the 30 days preceding low-risk non-cardiac surgery.

Denominator statement: Number of low-risk, non-cardiac surgeries performed at the hospital outpatient facility.

Level of Analysis: Population: national, Clinicians: Other, Program: Other, Facility/Agency Hospital Outpatient Department Outpatient Imaging Efficiency (OIE)

Data Source: Electronic administrative data/claims

Measure developer: Centers for Medicare and Medicaid Services

Type of Endorsement (full or time-limited): Full endorsement

Attachments: N/A

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** #: IEP-010-10 **NQF Project:** Efficiency: Imaging Efficiency
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Cardiac Imaging for Preoperative Risk Assessment for Non-Cardiac Low-Risk Surgery
De.2 **Brief description of measure**: This measure calculates the percentage of low-risk, non-cardiac surgeries performed at a hospital outpatient facility with a Stress Echocardiography, SPECT MPI or Stress MRI study performed in the 30 days prior to the surgery at a hospital outpatient facility(e.g., endoscopic, superficial, cataract surgery, and breast biopsy procedures). Results are to be segmented and reported by hospital outpatient facility where the imaging procedure was performed.
1.1-2 **Type of Measure:** efficiency/cost De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** Not applicable.
De.4 **National Priority Partners Priority Area:** Overuse, safety De.5 **IOM Quality Domain**: efficiency, safety De.6 **Consumer Care Need:** Living With Illness

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*)**:**	**A** **Y☐** **N☐**

A.3 Measure Steward Agreement: government entity- public domain- No Agreement **A.4 Measure Steward Agreement attached:**	
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 Accountability, Patient safety through reduction in radiation exposure.	**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.1Testing:** Yes, fully developed and tested **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: high resource use, other **1a.2** Safety **1a.3 Summary of Evidence of High Impact:** Single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI) is the most utilized advanced imaging procedure, (defined as computed tomography, magnetic resonance imaging or nuclear medicine studies), with over 2 million procedures being conducted annually across all settings.(1) Further, utilization of such cardiac imaging among Medicare beneficiaries has substantially increased in recent years. For example, between 1998 and 2006, the rate of myocardial perfusion imaging (MPI) use in Medicare beneficiaries increased 51 percent among cardiologists in the hospital setting, and by 215 percent in private offices.(2) During the same time period, total Medicare Part B payments for MPI across all settings of care increased by 227 percent.(2) In the hospital outpatient setting, 762,419 SPECT MPI, Stress MRI and Stress Echocardiography procedures were performed in 2008 alone.(1) During our initial stages of the measure development process it became apparent that cardiac imaging was a gap area that had not been addressed in the first set of OIE measures or by other measure development efforts. An analysis by Gibbons et al. found that of all SPECT MPI procedures performed at the Mayo Clinic Rochester in May 2005, 14 percent were considered inappropriate using criteria published by the American	**1a** C☐ P☐ M☐ N☐

Comment [KP1]: 1a. The measure focus addresses:
•a specific national health goal/priority identified by NQF's National Priorities Partners; OR
•a demonstrated high impact aspect of healthcare (e.g., affects large numbers, leading cause of morbidity/mortality, high resource use (current and/or future), severity of illness, and patient/societal consequences of poor quality).

College of Cardiology Foundation and the American Society of Nuclear Cardiology, and an additional 11 percent were of indeterminate appropriateness.(3) This study also found that during the same time period, 18 percent of all stress echocardiograms performed were inappropriate, and an additional 9 percent were indeterminate.(3)

Increased utilization of imaging services also poses a safety concern for patients. An additional analysis of Medicare claims data found that radiation exposure for Medicare beneficiaries increased by 5 percent annually from 1997 through 2006 and declined by about 5 percent in 2007. Annual radiation exposure per radiation inducing imaging service procedure increased by 164 percent in emergency departments and 90 percent in physician offices from 1997 to 2007. The growth in radiation exposure was fairly consistent across socio-demographic groups from 1997 to 2007. The increase in CT procedures and nuclear medicine over the study period contributed to the vast majority of the increase in radiation exposure due to imaging services.(4)

1a.4 Citations for Evidence of High Impact: 1.) The Lewin Group, "NQF Supplemental Preoperative Cardiac Imaging for Low-Risk Surgery," analysis of Medicare Calendar Year 2007 claims data prepared for the Centers for Medicare & Medicaid Services, HHS Contract No: HHSM-500-2005-0024I, Order No. 0002.

"NQF Supplemental Preoperative Cardiac Imaging for Low-Risk Surgery", for additional detail, see pages 1 – 2, available at:

URL: ftp.lewin.com
User Name: CMS.2009
Password: OIE2009=
*This secure FTP site is available Monday through Friday from 7:30 AM – 9:00 PM (EST)

Special Note: If using Internet Explorer 7 or 8 please follow the following instructions to access the site:

1. In Internet Explorer (IE), enter ftp://ftp.lewin.com
2. Enter the above user name and password and click "Log On."
3. You will receive the "cannot display webpage" message in your browser.
4. Click the "View" drop-down menu and choose "Open FTP site in Windows Explorer."
5. You should be prompted a second time for the username and password credentials. Enter these again.
6. Once this is done, the familiar explorer view will open, and you will be able to access files on the site.

2.) Levin DC, Rao VM, Parker L, et al. Recent payment and utilization trends in radionuclide myocardial perfusion imaging: Comparison between self-referral and referral to radiologists. J Am Coll Radiol 2009;6:437-441.

3.) Gibbons RJ, Miller TD, Hodge D, et al. Application of appropriateness criteria to stress single-photon emission computed tomography sestamibi studies and stress echocardiograms in an academic medical center. J Am Coll Cardiol 2008;51:1283-9.

4.) Namrata Sen, Sophie Shen, Mark Zezza, Susan Arday, Joan DaVanzo, Thomas Dehn, Michael Pentecost, Staci Barnett, "Trends in Radiation Exposure Due to Diagnostic Imaging Services among Fee-For-Service Medicare Beneficiaries from 1997 through 2007", AcademyHealth Annual Research Meeting poster session, June 2009.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: Cardiac imaging is among the most common imaging services in the Medicare population, and has experienced significant growth in the past decade. Nuclear imaging has been one of the major contributors to the growth in radiation exposure in the Medicare population. The "Preoperative Evaluation for Low-Risk Non-Cardiac Surgery Risk Assessment" measure provides the opportunity to establish a cardiac imaging efficiency measure based on a benchmark level of performance, and thus further the effort to promote the appropriate use of cardiac imaging services.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across

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N☐

Comment [KP2]: 1b. Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating considerable variation, or overall poor performance, in the quality of care across providers and/or population groups (disparities in care).

Comment [k3]: 1 Examples of data on opportunity for improvement include, but are not limited to: prior studies, epidemiologic data, measure data from pilot testing or implementation. If data are not available, the measure focus is systematically assessed (e.g., expert panel rating) and judged to be a quality problem.

providers:
Analysis of Medicare claims data indicates little variation in provision of service for this measure, which provides the opportunity to set a benchmark. The measure ratio ranged from a minimum value of 0.000 to a maximum of 0.0778 with a weighted average ratio of 0.0054. Ten percent of the 3,266 hospitals included in the analysis had a measure ratio above 0.0129, 5 percent of the hospitals had a ratio above 0.0170, and 1 percent of hospitals had a ratio above 0.0289. (1)

Subgroup analysis was performed for geographic area, teaching status, and bed size. Compared to rural areas (average ratio of 0.0067), hospitals in urban areas had a slightly lower ratio at 0.0050. In terms of teaching status (i.e., teaching versus non-teaching) hospitals had the same measure ratios (average ratio of 0.0051); however major teaching hospitals had a slightly higher ratio (average ratio of 0.0067). Further, with the exception of the 51-100 bed size hospitals (average ratio 0.0066) the measure ratio was approximately the same for hospitals of different bed size (i.e., 0-50, 101-250, 251-500, greater than 500), ranging from 0.0051 to 0.0053.(1) By state, the measures ranged from 0.0003 in Maryland to 0.0111 in Minnesota.(1)

1b.3 Citations for data on performance gap:
1.) The Lewin Group, "NQF Supplemental Preoperative Cardiac Imaging for Low-Risk Surgery," analysis of Medicare Calendar Year 2007 claims data prepared for the Centers for Medicare & Medicaid Services, HHS Contract No: HHSM-500-2005-0024I, Order No. 0002.

"NQF Supplemental Preoperative Cardiac Imaging for Low-Risk Surgery", for detailed data tables and graphs see Exhibits 3 – 6, pages 3 – 6 available at:

URL: ftp.lewin.com
User Name: CMS.2009
Password: OIE2009=
*This secure FTP site is available Monday through Friday from 7:30 AM – 9:00 PM (EST)

Special Note: If using Internet Explorer 7 or 8 please follow the following instructions to access the site:

1. In Internet Explorer (IE), enter ftp://ftp.lewin.com
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5. You should be prompted a second time for the username and password credentials. Enter these again.
6. Once this is done, the familiar explorer view will open, and you will be able to access files on the site.

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

1b.5 Citations for data on Disparities:
Not applicable.

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*)**:** SPECT MPI, Stress MRI, and Stress Echocardiography are specific procedures that must be ordered by a physician to be performed. Therefore, there is the distinct opportunity for the physician to not order the unnecessary study, and for the rendering physician to ensure that an unneeded study is not performed (controllability). The health care provider can use the results to reduce unnecessary imaging without compromising quality of care.

1c.2-3. Type of Evidence: evidence based guideline, systematic synthesis of research

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
The number of non-cardiac surgeries has progressively increased over the past twenty years,(1) with elderly patients undergoing at least four million major non-cardiac operations annually.(2) The risk of cardiac

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Comment [k4]: 1c. The measure focus is:
•an outcome (e.g., morbidity, mortality, function, health-related quality of life) that is relevant to, or associated with, a national health goal/priority, the condition, population, and/or care being addressed;
OR
•if an intermediate outcome, process, structure, etc., there is **evidence** that supports the specific measure focus as follows:
oIntermediate outcome – evidence that the measured intermediate outcome (e.g., blood pressure, Hba1c) leads to improved health/avoidance of harm or cost/benefit.
oProcess – evidence that the measured clinical or administrative process leads to improved health/avoidance of harm and
if the measure focus is on one step in a multi-step care process, it measures the step that has the greatest effect on improving the specified desired outcome(s).
oStructure – evidence that the measured structure supports the consistent delivery of effective processes or access that lead to improved health/avoidance of harm or cost/benefit.
oPatient experience – evidence that an association exists between the measure of patient experience of health care and the outcomes, values and preferences of individuals/ the public.
oAccess – evidence that an association exists between access to a health service and the outcomes of, or experience with, care.
oEfficiency – demonstration of an association between the measured resource use and level of performance with respect to one or more of the other five IOM aims of quality.

Comment [k5]: 4 Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multi-step process, the step with the greatest effect on the desired outcome should be selected as the focus of measurement. For example, although assessment of immunization status and recommending immunization are necessary steps, they are not sufficient to achieve the desired impact on health status – patients must be vaccinated to achieve immunity. This does not preclude consideration of measures of preventive screening interventions where there is a strong link with desired outcomes (e.g., mammography) or measures for multiple care processes that affect a single outcome.

complications (cardiac death or nonfatal myocardial infarction) can be high among elderly patients undergoing any type of surgery. Heart failure is a common and serious condition that significantly increases perioperative risk. Given the high prevalence of coronary heart disease (CHD) among Medicare beneficiaries, it is not surprising that cardiac complications are a major cause of perioperative morbidity and mortality.(3) An estimated one million patients scheduled to undergo a non-cardiac surgical procedure suffer a perioperative complication each year, with an estimated 50,000 patients having a perioperative myocardial infarction. The cost of these events is estimated to be $20 billion annually.(4)

Patients at elevated risk of cardiac events include those with unstable coronary syndromes, such as unstable angina or a recent myocardial infarction. Perioperative risk is proportional both to the severity of the patient's heart failure and the surgical risk, and much has been written concerning its mitigation.(5) In an attempt to identify patients at risk of a cardiac complication, stress echocardiography, SPECT-MPI and stress MRI are being used before non-cardiac surgery to assess the risk of cardiac complications.

In general, preoperative cardiac tests should be performed only if their results are likely to influence patient treatment. Cardiac intervention is rarely necessary to reduce the risk of surgery, as affirmed in a recent change to guidelines due to increasing evidence that preoperative coronary revascularization may not decrease perioperative cardiac events.(2, 6) Guidelines and appropriateness criteria provide specific guidance that SPECT MPI and stress echocardiography should not be used in the preoperative evaluation for low-risk non-cardiac surgical procedures. Procedures with low risk involve less hemodynamic stress on the body; these include breast surgeries, cataract surgeries, endoscopic procedures, superficial procedures, and ambulatory surgeries. (3)

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:** Not applicable.

1c.7 **Summary of Controversy/Contradictory Evidence:** Not applicable.

1c.8 **Citations for Evidence (***other than guidelines***):** 1.) Hernandez AF, Newby KI, O'Connor CM. Preoperative evaluation for major non-cardiac surgery. Arch Intern Med. 2004; 164: 1729 –1736.

2.) Gregoratos G. Current guideline-based preoperative evaluation provides the best management of patients undergoing noncardiac surgery. Circulation 2008; 117(24): 3134-44. Citing: National Center for Health Statistics. Health, United States 2006: inpatient surgery. November 2006. Available at: http://www.cdc.gov/nchs/fastats /insurg.htm.

3.) Fleisher LA, Eagle KA, Shaffer T, Anderson GF. Perioperative- and long-term mortality rates after major vascular surgery: the relationship to preoperative testing in the Medicare population. Anesth.Analg. 1999;89(4):849-55.

4.) Fleisher LA and Eagle KA. Clinical practice. Lowering cardiac risk in noncardiac surgery. N Engl J Med 2001; 345(23) 1677-82.

5.) Savino J and Fleisher LA. Assessment of patients with heart disease for fitness for noncardiac surgery. Essential Cardiology: Principles and Practice. Ed. Rosendorf. 2nd ed. 2007.

6.) Hollenberg SM. Preoperative cardiac risk assessment. Chest 1999;115(5 Suppl): 51S-7S

1c.9 **Quote the Specific guideline recommendation (***including guideline number and/or page number***):**
1) American College of Cardiology Foundation and the American Heart Association (2007)(1)

a. Patients with active cardiac conditions in whom non-cardiac surgery is planned should be evaluated and treated per ACC/AHA guidelines and, if appropriate, consider proceeding to the operating room (Class I, Level B; Pages e168 and e181).
b. Patients undergoing low risk surgery are recommended to proceed to planned surgery (Class I, Level B;

Comment [k6]: 3 The strength of the body of evidence for the specific measure focus should be systematically assessed and rated (e.g., USPSTF grading system http://www.ahrq.gov/clinic/uspstf07/methods/benefit.htm). If the USPSTF grading system was not used, the grading system is explained including how it relates to the USPSTF grades or why it does not. However, evidence is not limited to quantitative studies and the best type of evidence depends upon the question being studied (e.g., randomized controlled trials appropriate for studying drug efficacy are not well suited for complex system changes). When qualitative studies are used, appropriate qualitative research criteria are used to judge the strength of the evidence.

Page e 168).
c. Noninvasive testing is not useful for patients undergoing low-risk non-cardiac surgery (Class III, Level C; Page e181).

2) American College of Physicians (1997)(2)

a. Low risk is predicted by the presence of 0 or 1 cardiac risk factors [as defined in guideline] (Strong Evidence for patients having vascular surgery; Page 309). Low-risk patients may proceed directly to surgery without further noninvasive testing because no testing method has been shown to refine risk assessment in this group.
b. Noninvasive assessment of resting left ventricular ejection fraction is unlikely to add risk discrimination to the clinical examination. [ACP] recommends against the use of transthoracic echocardiography to predict perioperative risk (Strong Evidence; Page 310).
c. [ACP] recommends against the use of dobutamine stress echocardiography for risk stratification in low- and intermediate-risk patients who are undergoing nonvascular surgery (Weak Evidence; Page 310).

3) American College of Cardiology Foundation, American Society of Echocardiography, American College of Emergency Physicians, et al. (2008)(3)

a. Stress echocardiography is inappropriate for preoperative evaluation for low-risk non-cardiac surgery risk assessment in patients with minor or intermediate clinical risk predictors (Appropriateness = 1; Page 1483).

4) American College of Cardiology Foundation and the American Society of Nuclear Cardiology (2005)(4)

a. SPECT MPI is inappropriate for preoperative evaluation for low-risk non-cardiac surgery risk assessment (Appropriateness = 1; Page 1593).

5) American College of Cardiology Foundation, American College of Radiology, Society of Cardiovascular Computed Tomography, et al. (2006)(5)

a. Cardiac MR is inappropriate for preoperative evaluation for low-risk non-cardiac surgery risk assessment in patients with intermediate perioperative risk (Appropriateness = 2; Page 1486).

1c.10 Clinical Practice Guideline Citation:

1.) Fleisher LA, Beckman JA, Brown KA, et al. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to revise the 2002 Guidelines on perioperative cardiovascular evaluation for noncardiac surgery). J Am Col Cardiol 2007; 50(17):e159-242.

2.) Guidelines for assessing and managing the perioperative risk from coronary artery disease associated with major noncardiac surgery. American College of Physicians. Ann Intern Med 1997; 127(4): 309-12.

3.) Douglas PS, Khandheria B, Stainbeck RF, Weissman NJ. ACCF/ASE/ACEP/AHA/ASNC/SCAI/SCCT/SCMR 2008 appropriateness criteria for stress echocardiography: a report of the American College of Cardiology Foundation Appropriateness Criteria Task Force, American Society of Echocardiography, American College of Emergency Physicians, American Heart Association, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and Society for Cardiovascular Magnetic Resonance: endorsed by the Heart Rhythm Society and the Society of Critical Care Medicine. Circulation 2008; 117(11): 1478-97.

4.) Brindis RG, Douglas PS, Hendel RC, et al. ACCF/ASNC appropriateness criteria for single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI): a report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group and the American Society of Nuclear Cardiology endorsed by the American Heart Association. J Am Coll Cardiol 2005; 46(8):1587-605.

5.) Hendel RC, Patel MR, Kramer CM, et al. ACCF/ACR/SCCT/SCMR/ASNC/NASCI/SCAI/SIR 2006 appropriateness criteria for cardiac computed tomography and cardiac magnetic resonance imaging: a report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group, American College of Radiology, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, American Society of Nuclear Cardiology, North American Society for Cardiac Imaging, Society for Cardiovascular Angiography and Interventions, and Society of Interventional Radiology. J Am Coll Cardiol 2006; 48(7): 1475-97.

1c.11 **National Guideline Clearinghouse or other URL:** 1) American College of Cardiology Foundation and the American Heart Association: http://content.onlinejacc.org/cgi/reprint/50/17/e159.pdf 2)American College of Physicians: http://www.annals.org/content/127/4/309.full.pdf+html 3)American College of Cardiology Foundation, American Society of Echocardiography, American College of Emergency Physicians, et al.: http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.107.189097v1 4) American College of Cardiology Foundation and the American Society of Nuclear Cardiology: http://content.onlinejacc.org/cgi/reprint/46/8/1587.pdf 5) American College of Cardiology Foundation, American College of Radiology, Society of Cardiovascular Computed Tomography, et al.: http://content.onlinejacc.org/cgi/reprint/48/7/1475.pdf

1c.12 **Rating of strength of recommendation (***also provide narrative description of the rating and by whom***):**
1) American College of Cardiology Foundation and the American Heart Association: a. Class I, Level B; b. Class I, Level B; c. Class III, Level C. 2) American College of Physicians: a. Strong Evidence; b. Strong Evidence; c. Weak Evidence. 3) American College of Cardiology Foundation, American Society of Echocardiography, American College of Emergency Physicians, et al.: All American College of Cardiology Foundation ratings in this guideline use a similar method of employing an Appropriateness Criteria Technical Panel to assess the appropriateness of a recommendation, and as such, the recommendations do not have different rating strengths. All recommendations are based on a combination of scientific literature and expert opinion / consensus. 4) American College of Cardiology Foundation and the American Society of Nuclear Cardiology: All American College of Cardiology Foundation ratings in this guideline use a similar method of employing an Appropriateness Criteria Technical Panel to assess the appropriateness of a recommendation, and as such, the recommendations do not have different rating strengths. All recommendations are based on a combination of scientific literature and expert opinion / consensus. 5) American College of Cardiology Foundation, American College of Radiology, Society of Cardiovascular Computed Tomography, et al.: All American College of Cardiology Foundation ratings in this guideline use a similar method of employing an Appropriateness Criteria Technical Panel to assess the appropriateness of a recommendation, and as such, the recommendations do not have different rating strengths. All recommendations are based on a combination of scientific literature and expert opinion / consensus.

Comment [k7]: USPSTF grading system **http://www.ahrq.gov/clinic/uspstf/grades.htm**: **A -** The USPSTF recommends the service. There is high certainty that the net benefit is substantial. **B -** The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. **C -** The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is at least moderate certainty that the net benefit is small. Offer or provide this service only if other considerations support the offering or providing the service in an individual patient. **D -** The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. **I -** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

1c.13 **Method for rating strength of recommendation** (*If different from* USPSTF system*, also describe rating and how it relates to USPSTF*)**:**
The process used by the American College of Cardiology Foundation in three of the aforementioned guidelines (#3, 4, and 5) to determine appropriateness of recommendations is a modified Delphi process, and generally employs the following four steps:

a. Indication Development and Literature Review

Scientific literature, previously published guidelines, and clinical policy statements were consulted in order to develop the indications to be included in the appropriateness criteria. Indications to be rated by the Technical Panel capture symptomology, clinical need for imaging, patient population, and other specific factors. Selection of clinical indicators also includes consideration of clinical scenarios for which there is practice variation.

b. Expert Panel Rating

A Technical Expert panel reviews the indications selected for rating and assigns an appropriateness rating based on available evidence for each indication. If available, ACC/AHA clinical practice guideline recommendations are included as a guide; if there is a lack of evidence or guideline, clinical experience is expected to form the basis for expert rating. The following scoring system is used:

Score 7 to 9: Appropriate test for specific indication (test is generally acceptable and is a reasonable approach for the indication)
Score 4 to 6: Uncertain or unclear whether appropriate for specific indication (test may be generally acceptable and may be a reasonable approach for the indication)
Score 1 to 3: Inappropriate test for the indication (test is not generally acceptable and is not a reasonable approach for the indication)

c. Panel Meeting

After the initial expert panel ratings are complete, the panel meets to discuss the indication list. The distribution and mean value of appropriateness ratings are presented at the meeting, to which each panel member can compare his or her original rating. After discussion among all panel members, a second round of appropriateness rating occurs, either at the meeting or within the weeks following the meeting.

d. Rating Tabulation

After second round appropriateness ratings have been submitted, they are tabulated and a "level of agreement" measure is used to determine agreement for each indication. Agreement is generally defined as three or fewer panelists rating outside the three-point region containing the median score. If the panel does not agree, the indication is marked as "uncertain" regardless of the median score.

1) American College of Cardiology Foundation and the American Heart Association (2007)

The ACC/AHA Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery conducted a comprehensive review of the literature relevant to perioperative cardiac evaluation published since the last publication of their guidelines in 2002. As a result of these searches, more than 400 relevant, new articles were identified and reviewed by the committee for guideline revision. Using evidence-based methodologies developed by the ACC/AHA Task Force on Practice Guidelines, the committee revised the guidelines text and recommendations.
The classification of recommendations and level of evidence is as follows:

Class of Recommendation

Class	Description
I	Benefit >>> Risk
IIa	Benefit >> Risk: Additional studies with focused objectives needed
IIb	Benefit = Risk: Additional studies with broad objectives needed; Additional registry data would be helpful
III	Risk = Benefit: No additional studies needed

Level of Evidence

Level	Description
A:	Multiple (3-5) population risk strata evaluated; general consistency of direction and magnitude of effect
B:	Limited (2-3) population risk strata evaluated
C:	Very limited (1-2) population risk strata evaluated

2) American College of Physicians (1997)

Recommendations presented in this guideline summarize evidence supporting the clinical and noninvasive evaluation of a patient. The American College of Physicians clinical efficacy assessment process considers blinding (independent interpretation of the test results and the outcome) and method of patient selection to greatly influence the quality and generalizability of study results. Studies on clinical and noninvasive testing were considered to be of "strong," "fair," or "weak" evidence. If a recommendation has no weighting for strength of evidence, no studies were found that related to that clinical decision point.

3) American College of Cardiology Foundation, American Society of Echocardiography, American College of

Emergency Physicians, et al. More details on the specific method used to determine the appropriateness of those indications specified in the echocardiography guideline can be found within the published guideline. 4) American College of Cardiology Foundation and the American Society of Nuclear Cardiology More details on the specific method used to determine the appropriateness of those indications specified in the SPECT MPI guideline can be found within the published guideline. 5) American College of Cardiology Foundation, American College of Radiology, Society of Cardiovascular Computed Tomography, et al.(6) More details on the specific method used to determine the appropriateness of those indications specified in the cardiac computed tomography and cardiac magnetic resonance imaging guideline can be found within the published guideline. 1c.14 **Rationale for using this guideline over others:** There was no need to choose among the guidelines as all were in accordance.	
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.1 **Numerator Statement (***Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Number of Stress Echocardiography, SPECT MPI and Stress MRI studies performed at the hospital outpatient facility in the 30 days preceding low-risk non-cardiac surgery. 2a.2 **Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** The 30 days preceding a low-risk, non-cardiac surgery. 2a.3 **Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** SPECT MPI Codes: 78464 – MPI, SPECT, Single, At Rest or Stress 78465 – MPI, SPECT, Multiple, At Rest and/or Stress [Note for 2010 there are new SPECT MPI codes replacing 78464 and 78465. The new codes are 78451 and 78452.] Stress Echocardiography Codes: 93350, C8928 - Echocardiography, trans-thoracic, real time with image documentation, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress with	**2a-specs** **C☐** **P☐** **M☐** **N☐**

Comment [KP8]: 2a. The measure is well defined and precisely specified so that it can be implemented consistently within and across organizations and allow for comparability. The required data elements are of high quality as defined by NQF's Health Information Technology Expert Panel (HITEP) .

interpretation and report
93351 (New for 2009) – including performance of continuous electrocardiographic monitoring with physician supervision

Stress MRI Codes:
75559 – MRI with stress/imaging
75560 – MRI with flow/velocity/stress
75563 – MRI with stress imaging and dye
75564 – MRI with flow/velocity/stress and dye

These codes must be found in the 30-day window preceding a low-risk, non-cardiac surgery as defined in the "Denominator Details."

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):**
Number of low-risk, non-cardiac surgeries performed at the hospital outpatient facility.

2a.5 Target population gender: Female, Male
2a.6 Target population age range: Medicare population

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
Low-risk, non-cardiac surgical procedures must be conducted in the given calendar year for the measure evaluation.

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
The categories for low-risk surgery are based on the American College of Cardiology (ACC) Appropriateness Criteria for SPECT MPI, including endoscopic procedures, superficial procedure, cataract surgery, and breast biopsy. The list of procedures has been harmonized with the ACC proposed measure for low-risk surgery.

Surgery/Integumentary System: Breast
19100 Biopsy of breast
19101 Biopsy of breast
19102 Bx breast percut w/image
19103 Bx breast percut w/device

Surgery/Respiratory System: Accessory Sinuses
31231 Nasal endoscopy, dx
31233 Nasal/sinus endoscopy, dx
31235 Nasal/sinus endoscopy, dx
31237 Nasal/sinus endoscopy, surg
31238 Nasal/sinus endoscopy, surg
31239 Nasal/sinus endoscopy, surg
31240 Nasal/sinus endoscopy, surg
31267 Endoscopy, maxillary sinus
31276 Sinus surgical endoscopy
31299 Sinus surgery procedure

Surgery/Respiratory System: Larynx
31505 Diagnostic laryngoscopy
31510 Laryngoscopy with biopsy
31511 Remove foreign body, larynx
31513 Injection into vocal cord
31515 Laryngoscopy for aspiration
31520 Diagnostic laryngoscopy

31525 Diagnostic laryngoscopy	
31526 Diagnostic laryngoscopy	
31527 Laryngoscopy for treatment	
31528 Laryngoscopy and dilatation	
31529 Laryngoscopy and dilatation	
31530 Operative laryngoscopy	
31531 Operative laryngoscopy	
31535 Operative laryngoscopy	
31536 Operative laryngoscopy	
31540 Operative laryngoscopy	
31541 Operative laryngoscopy	
31560 Operative laryngoscopy	
31561 Operative laryngoscopy	
31570 Laryngoscopy with injection	
31571 Laryngoscopy with injection	
31575 Diagnostic laryngoscopy	
31576 Laryngoscopy with biopsy	
31577 Remove foreign body, larynx	
31578 Removal of larynx lesion	
31579 Diagnostic laryngoscopy	
Surgery/Respiratory System: Trachea and Bronchi	
31615 Visualization of windpipe	
31620 Endobronchial us add-on	
31622 Diagnostic bronchoscopy	
31623 Dx bronchoscope/brush	
31624 Dx bronchoscope/lavage	
31625 Bronchoscopy with biopsy	
31628 Bronchoscopy with biopsy	
31629 Bronchoscopy with biopsy	
31632 Bronchoscopy/lung bx, add'l	
31633 Bronchoscopy/needle bx add'l	
31645 Bronchoscopy, clear airways	
31646 Bronchoscopy,reclear airways	
Surgery/Respiratory System: Lungs and Pleura	
33508 Endoscopic vein harvest	
37500 Endoscopy ligate perf veins	
37501 Vascular endoscopy procedure	
39400 Visualization of chest	
Surgery/Digestive System: Esophagus	
43200 Esophagus endoscopy	
43201 Esoph scope w/submucous inj	
43202 Esophagus endoscopy, biopsy	
43204 Esophagus endoscopy & inject	
43205 Esophagus endoscopy/ligation	
43215 Esophagus endoscopy	
43216 Esophagus endoscopy/lesion	
43217 Esophagus endoscopy	
43219 Esophagus endoscopy	
43220 Esophagus endoscopy,dilation	
43226 Esophagus endoscopy,dilation	
43227 Esophagus endoscopy, repair	
43228 Esophagus endoscopy,ablation	
43231 Esoph endoscopy w/us exam	
43232 Esoph endoscopy w/us fn bx	
43234 Upper GI endoscopy, exam	

43235 Upper GI endoscopy,diagnosis	
43236 Upper GI scope w/submuc inj	
43237 Endoscopic us exam, esoph	
43238 Upper GI endoscopy w/us fn bx	
43239 Upper GI endoscopy, biopsy	
43241 Upper GI endoscopy with tube	
43242 Upper GI endoscopy w/us fn bx	
43243 Upper GI endoscopy & inject.	
43244 Upper GI endoscopy/ligation	
43246 Place gastrostomy tube	
43247 Operative upper GI endoscopy	
43248 Upper GI endoscopy/guidewire	
43249 Esophagus endoscopy,dilation	
43260 Endoscopy, bile duct/pancreas	
43261 Endoscopy, bile duct/pancreas	
43262 Endoscopy, bile duct/pancreas	
43263 Endoscopy, bile duct/pancreas	
43264 Endoscopy, bile duct/pancreas	
43265 Endoscopy, bile duct/pancreas	
43267 Endoscopy, bile duct/pancreas	
43268 Endoscopy, bile duct/pancreas	
43269 Endoscopy, bile duct/pancreas	
43271 Endoscopy, bile duct/pancreas	
43272 Endoscopy, bile duct/pancreas	
Surgery/Digestive System: Intestines (Except Rectum)	
44360 Small bowel endoscopy	
44361 Small bowel endoscopy, biopsy	
44363 Small bowel endoscopy	
44383 Ileoscopy w/stent	
44385 Endoscopy of bowel pouch	
44386 Endoscopy, bowel pouch, biopsy	
44388 Colon endoscopy	
44389 Colonoscopy with biopsy	
44390 Colonoscopy for foreign body	
44391 Colonoscopy for bleeding	
44392 Colonoscopy & polypectomy	
44393 Colonoscopy, lesion removal	
44397 Colonoscopy w stent	
Surgery/Digestive System: Rectum	
45300 Proctosigmoidoscopy	
45303 Proctosigmoidoscopy	
45305 Proctosigmoidoscopy; biopsy	
45307 Proctosigmoidoscopy	
45308 Proctosigmoidoscopy	
45309 Proctosigmoidoscopy	
45315 Proctosigmoidoscopy	
45317 Proctosigmoidoscopy	
45320 Proctosigmoidoscopy	
45321 Proctosigmoidoscopy	
45327 Proctosigmoidoscopy w/stent	
45330 Sigmoidoscopy, diagnostic	
45331 Sigmoidoscopy and biopsy	
45332 Sigmoidoscopy	
45333 Sigmoidoscopy & polypectomy	
45334 Sigmoidoscopy for bleeding	
45335 Sigmoidoscope w/submuc inj	

45337 Sigmoidoscopy, decompression
45338 Sigmoidoscopy
45339 Sigmoidoscopy
45340 Sig w/balloon dilation
45341 Sigmoidoscopy w/ultrasound
45342 Sigmoidoscopy w/us guide bx
45345 Sigmoidoscopy w/stent
45378 Diagnostic colonoscopy
45379 Colonoscopy
45380 Colonoscopy and biopsy
45381 Colonoscope, submucous inj
45382 Colonoscopy,control bleeding
45383 Colonoscopy, lesion removal
45384 Colonoscopy
45385 Colonoscopy, lesion removal
45387 Colonoscopy w/stent
45391 Colonoscopy w/endoscope us
45392 Colonoscopy w/endoscopic fnb

Surgery/Digestive System: Anus
46600 Diagnostic anoscopy
46604 Anoscopy and dilation
46606 Anoscopy and biopsy
46608 Anoscopy; remove foreign body
46610 Anoscopy; remove lesion
46612 Anoscopy; remove lesions
46614 Anoscopy; control bleeding

Surgery/Digestive System: Biliary Tract
47561 Laparo w/cholangio/biopsy

Surgery/Digestive System: Abdomen, Peritoneum and Omentum
49322 Laparoscopy, aspiration

Surgery/Urinary System: Kidney
50551 Kidney endoscopy
50553 Kidney endoscopy
50555 Kidney endoscopy & biopsy
50557 Kidney endoscopy & treatment
50559 Renal endoscopy; radiotracer
50561 Kidney endoscopy & treatment

Surgery/Urinary System: Ureter
50951 Endoscopy of ureter
50953 Endoscopy of ureter
50955 Ureter endoscopy & biopsy
50970 Ureter endoscopy
50972 Ureter endoscopy & catheter
50974 Ureter endoscopy & biopsy
50976 Ureter endoscopy & treatment
50978 Ureter endoscopy & tracer
50980 Ureter endoscopy & treatment

Surgery/Urinary System: Bladder
51715 Endoscopic injection/implant
52000 Cystoscopy
52001 Cystoscopy, removal of clots
52005 Cystoscopy & ureter catheter

52007 Cystoscopy and biopsy
52010 Cystoscopy & duct catheter
52204 Cystoscopy
52282 Cystoscopy, implant stent
52327 Cystoscopy, inject material
52330 Cystoscopy and treatment
52351 Cystouretro & or pyeloscope
52352 Cystouretro w/stone remove
52353 Cystouretero w/lithotripsy
52354 Cystouretero w/biopsy
52355 Cystouretero w/excise tumor
52402 Cystourethro cut ejacul duct

Surgery/Female Genital System: Cervix Uteri
57452 Examination of vagina
57454 Vagina examination & biopsy
57455 Biopsy of cervix w/scope
57456 Endocerv curettage w/scope
57460 Cervix excision
57461 Conz of cervix w/scope, leep

Surgery/Female Genital System: Corpus Uteri
58555 Hysteroscopy, dx, sep proc
58558 Hysteroscopy, biopsy
58559 Hysteroscopy, lysis
58560 Hysteroscopy, resect septum
58562 Hysteroscopy, remove fb
58565 Hysteroscopy, sterilization

Surgery/Female Genital System: Oviduct/Ovary
58670 Laparoscopy, tubal cautery
58671 Laparoscopy, tubal block

Surgery/Eye and Ocular Adnexa: Anterior Segment
66820 Incision, secondary cataract
66821 After cataract laser surgery
66830 Removal of lens lesion
66982 Cataract surgery, complex
66983 Remove cataract, insert lens

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** None.

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Not applicable.

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
Not applicable.

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***):**
Not applicable.

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

Comment [k9]: 11 Risk factors that influence outcomes should not be specified as exclusions.
12 Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

2a.18-19 Type of Score: ratio
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.) Identify patients who had a low-risk, non-cardiac surgery performed in a hospital outpatient facility during the year of analysis using claims data – this is the denominator
2.) Of the patients identified in the denominator, identify those who also had a cardiac imaging procedure performed at the hospital in the 30 days preceding the surgery – this is the numerator
3.) Calculate the measure ratio of the numerator to the denominator
4.) The unit of evaluation is the procedure, not the patient

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Comparison to the national average to determine variation from the average and comparison to the 90th percentile to identify outliers in performance.

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.***):**
This measure was constructed using the 100 percent Medicare Fee-For-Service (FFS) outpatient standard-analytical files (SAFs) from 2007. These Outpatient SAFs contain the claims data on the imaging utilization and low-risk surgical procedures performed in outpatient departments (including emergency department services), which are necessary to attribute the measures to specific facilities.

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.cms.hhs.gov/IdentifiableDataFiles/02_StandardAnalyticalFiles.asp

2a.29-31 Data dictionary/code table web page URL or attachment: URL
http://www.cms.hhs.gov/IdentifiableDataFiles/02_StandardAnalyticalFiles.asp

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Population: national, Clinicians: Other, Program: Other, Facility/Agency Hospital Outpatient Department Outpatient Imaging Efficiency (OIE)

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Ambulatory Care: Hospital Outpatient

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

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)***:** This measure was constructed using the 100 percent Medicare FFS outpatient standard-analytical-files (SAFs) from 2007.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)***:**
Certain precautions were taken to ensure that procedures were not counted multiple times. When calculating the measures, the measure developers were only concerned with procedures associated with technical and global modifiers, as these modifiers refer to services provided by the facility. This reduces the possibility of double-counting procedures, since a single procedure may result in both a technical and professional record on the Medicare claims files. There were very few instances when this occurred as it related to procedures applicable to the measures.

2b
C☐
P☐
M☐
N☐

Comment [KP10]: 2b. Reliability testing demonstrates the measure results are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period.

Comment [k11]: 8 Examples of reliability testing include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing may address the data items or final measure score.

Further, initial measure testing was conducted to look for consistencies in measure calculations between geographic locations (i.e., urban, rural, state) and hospital characteristics (i.e., teaching status, bed size).

In addition, for purposes of the measure ratio estimation specific parameters were established for adequate case counts at individual facilities. Minimum case count requirements were developed for each facility in order to assure a 90 percent confidence level for the observed facility rate. Case count requirements ranged between 31 and 67 and varied based on the observed facility rate and the required precision.

"NQF Supplemental Data Analysis Methodology and Case Count Requirements" provides a detailed description of the data analysis methods (pages 1 - 2) and the case count requirements calculations (pages 2 -8). This supplemental material is available at:

URL: ftp.lewin.com
User Name: CMS.2009
Password: OIE2009=
*This secure FTP site is available Monday through Friday from 7:30 AM – 9:00 PM (EST)

Special Note: If using Internet Explorer 7 or 8 please follow the following instructions to access the site:

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6. Once this is done, the familiar explorer view will open, and you will be able to access files on the site.

2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
The results of initial measure testing were consistent between geographic locations (i.e., urban, rural, state) and hospital characteristics (i.e., teaching status, bed size).

2c. Validity testing

2c.1 **Data/sample** *(description of data/sample and size)*: This measure was constructed using the 100 percent Medicare FFS outpatient standard-analytical claims files (SAFs) from 2007.

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*:
The Medicare Claims data are used for payment purposes for services rendered by a provider. The data undergo prepayment claims analysis and post-payment audits as part of the CMS administrative process. The analytic files used by the measure developer were post-adjudicated claims.

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
The measure is based on analysis of administrative claims data. The data were considered to have face validity as representing services rendered by the hospital. Additional data testing was not involved.

2c
C ☐
P ☐
M ☐
N ☐

2d. Exclusions Justified

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

2d.2 **Citations for Evidence:**
Not applicable.

2d.3 **Data/sample** *(description of data/sample and size)*: Not applicable.

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

2d
C ☐
P ☐
M ☐
N ☐
NA ☐

Comment [KP12]: 2c. Validity testing demonstrates that the measure reflects the quality of care provided, adequately distinguishing good and poor quality. If face validity is the only validity addressed, it is systematically assessed.

Comment [k13]: 9 Examples of validity testing include, but are not limited to: determining if measure scores adequately distinguish between providers known to have good or poor quality assessed by another valid method; correlation of measure scores with another valid indicator of quality for the specific topic; ability of measure scores to predict scores on some other related valid measure; content validity for multi-item scales/tests. Face validity is a subjective assessment by experts of whether the measure reflects the quality of care (e.g., whether the proportion of patients with BP < 140/90 is a marker of quality). If face validity is the only validity addressed, it is systematically assessed (e.g., ratings by relevant stakeholders) and the measure is judged to represent quality care for the specific topic and that the measure focus is the most important aspect of quality for the specific topic.

Comment [KP14]: 2d. Clinically necessary measure exclusions are identified and must be:
•supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion;
AND
•a clinically appropriate exception (e.g., contraindication) to eligibility for the measure focus;
AND
•precisely defined and specified:
–if there is substantial variability in exclusions across providers, the measure is specified so that exclusions are computable and the effect on the measure is transparent (i.e., impact clearly delineated, such as number of cases excluded, exclusion rates by type of exclusion);
if patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that it strongly impacts performance on the measure and the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

Comment [k15]: 10 Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, sensitivity analyses with and without the exclusion, and variability of exclusions across providers.

Not applicable.

2d.5 **Testing Results** *(e.g., frequency, variability, sensitivity analyses)*:
Not applicable.

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)*:
Not applicable.

2e.3 **Testing Results** *(risk model performance metrics)*:
Not applicable.

2e.4 **If outcome or resource use measure is not risk adjusted, provide rationale:** Risk adjustment was determined not to be necessary as guidelines did not indicate further need for case mix adjustments.

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)*: This measure was constructed using the 100 percent Medicare FFS outpatient standard-analytical-files (SAFs) from 2007.

2f.2 **Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*:
One impediment to achieving high levels of precision and accuracy at the facility level is small case counts. This is an issue for many facilities identified in the data, as they do not perform a high volume of the relevant services. In the situation where a facility provides only a handful of the relevant services that are eligible for a measure, the results of the measure may be significantly impacted and skewed by one or two cases. Minimum case count requirements were developed for each facility in order to assure a 90 percent confidence level for the observed facility rate.

There are two different processes for determining required case counts depending on whether the facility rate is less than 0.05 or greater than 0.95 (i.e., towards the end of the range of possible rate values) or somewhere between 0.05 and 0.95 (inclusive). Each process has three steps: (1) determine reasonable levels of precision; (2) determine the level of confidence to be required for the measures; and (3) calculate the case counts needed to meet the precision requirements. For facility rates less than 0.05 or greater than 0.95, the case count needed to attain the required precision was calculated to be 45 cases. For facility rates between 0.05 and 0.95, the case count needed to attain the required precision ranged from 31 to 67 cases. For more details on the minimum case count requirements determinations, please see the supplemental materials:

"NQF Supplemental Data Analysis Methodology and Case Count Requirements" provides a detailed description of the case count requirements calculations (pages 2 -8). This supplemental material is available at:

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2f
C☐
P☐
M☐
N☐

Comment [KP16]: 2e. For outcome measures and other measures (e.g., resource use) when indicated:
•an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified and is based on patient clinical factors that influence the measured outcome (but not disparities in care) and are present at start of care;[Error! Bookmark not defined.] OR rationale/data support no risk adjustment.

Comment [k17]: 13 Risk models should not obscure disparities in care for populations by including factors that are associated with differences/inequalities in care such as race, socioeconomic status, gender (e.g., poorer treatment outcomes of African American men with prostate cancer, inequalities in treatment for CVD risk factors between men and women). It is preferable to stratify measures by race and socioeconomic status rather than adjusting out differences.

Comment [KP18]: 2f. Data analysis demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful differences in performance.

Comment [k19]: 14 With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74% v. 75%) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall poor performance may not demonstrate much variability across providers.

Measure ratios were calculated for all hospitals facilities that are eligible in Hospital Outpatient Quality Data Reporting Program (HOP QDRP), regardless of whether the facility chooses to participate in the program or not. There are a total of 3,680 eligible facilities in HOP QDRP, which include short-term acute care hospitals as well as critical access hospitals (CAHs). Case count requirements were applied to exclude the hospitals that did not have a significant number of cases for this measure. After applying the limitations, 3,266 hospitals were eligible for measure calculation.

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)***:**
As noted previously, the measure ratio ranged from a minimum value of 0.000 to a maximum of 0.0778 with a weighted average ratio of 0.0054. Ten percent of the 3,266 hospitals included in the analysis had a measure ratio above 0.0129, 5 percent of the hospitals had a ratio above 0.0170, and 1 percent of hospitals had a ratio above 0.0289.(1) A table with detailed descriptive statistics is available in:

"NQF Supplemental Preoperative Cardiac Imaging for Low-Risk Surgery", for descriptive statistics table see Exhibit 3 on page 3. This supplemental material is available at:

URL: ftp.lewin.com
User Name: CMS.2009
Password: OIE2009=
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6. Once this is done, the familiar explorer view will open, and you will be able to access files on the site.

2g. Comparability of Multiple Data Sources/Methods

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

2g.2 **Analytic Method** *(type of analysis & rationale)***:**
Not applicable.

2g.3 **Testing Results** *(e.g., correlation statistics, comparison of rankings)***:**
Not applicable.

2g
C☐ P☐ M☐ N☐ NA☐

Comment [KP20]: 2g. If multiple data sources/methods are allowed, there is demonstration they produce comparable results.

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:**
Not applicable.

2h
C☐ P☐ M☐ N☐ NA☐

Comment [KP21]: 2h. If disparities in care have been identified, measure specifications, scoring, and analysis allow for identification of disparities through stratification of results (e.g., by race, ethnicity, socioeconomic status, gender);OR rationale/data justifies why stratification is not necessary or not feasible.

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:** not in use but testing completed **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*)**:** To promote higher quality, more efficient health care for Medicare beneficiaries, the Centers for Medicare & Medicaid Services (CMS) has implemented quality measure reporting programs for multiple settings of care. The Outpatient Prospective Payment System (OPPS) final rule released November 1, 2007 outlined the initial implementation of the Hospital Outpatient Quality Data Reporting Program (HOP QDRP), under which hospitals would report data for 2008 services on the quality of hospital outpatient care. The final rule was based on Section 109(a) of the Medicare Improvements and Extension Act, under Title 1 of the Tax Relief and Health Care Act of 2006 (MIEA-TRHCA). Amending section 1833(t) of the Social Security Act, MIEA-TRHCA requires that hospitals submit quality data on outpatient services using standardized measures. Failure to submit such data will result in a 2.0 percentage point reduction in the hospital's OPPS annual payment update factor, beginning in calendar year (CY) 2009; however, because Medicare claims data are used for analysis for this measure, no active data submission is required of hospitals above and beyond the normal procedures used to submit claims for Medicare payment purposes. The Act requires that the quality measures used are (1) appropriate for the measurement of quality of care furnished by hospitals in outpatient settings; (2) reflect consensus among affected parties; and (3) to the extent feasible, include measures set forth by one or more national consensus building entities. **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***):** Not applicable. **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) **3a.4 Data/sample** *(description of data/sample and size)***:** Not applicable. **3a.5 Methods** *(e.g., focus group, survey, QI project)***:** Not applicable. **3a.6 Results** *(qualitative and/or quantitative results and conclusions)***:** Not applicable.	**3a** C☐ P☐ M☐ N☐
3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:**	
(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?**	**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:**	**3c** C☐ P☐

Comment [KP22]: 3a. Demonstration that information produced by the measure is meaningful, understandable, and useful to the intended audience(s) for both public reporting (e.g., focus group, cognitive testing) and informing quality improvement (e.g., quality improvement initiatives). An important outcome that may not have an identified improvement strategy still can be useful for informing quality improvement by identifying the need for and stimulating new approaches to improvement.

Comment [KP23]: 3b. The measure specifications are harmonized with other measures, and are applicable to multiple levels and settings.

Comment [k24]: 16 Measure harmonization refers to the standardization of specifications for similar measures on the same topic (e.g., *influenza immunization* of patients in hospitals or nursing homes), or related measures for the same target population (e.g., eye exam and HbA1c for *patients with diabetes*), or definitions applicable to many measures (e.g., age designation for children) so that they are uniform or compatible, unless differences are dictated by the evidence. The dimensions of harmonization can include numerator, denominator, exclusions, and data source and collection instructions. The extent of harmonization depends on the relationship of the measures, the evidence for the specific measure focus, and differences in data sources.

Comment [KP25]: 3c. Review of existing endorsed measures and measure sets demonstrates that the measure provides a distinctive or additive value to existing NQF-endorsed measures (e.g., provides a more complete picture of quality for a particular condition or aspect of healthcare).

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:**	**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*) Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** **C☐ P☐ M☐ 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.** This measure is a claims-based measure using CMS hospital outpatient claims data. Inaccuracies and errors may arise from errors in the coding used to retrieve the claims data used to calculate the measure. The measures development team has made sure to check the quality of their code to ensure that the retrieval coding is as accurate as possible. Further inaccuracies may arise from variation in claims coding at the different hospitals. CMS conducts prepayment claims analysis and post payment audits that should prevent this factor from having a major impact on the measure calculations performed on claims data.	**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**	**4e** **C☐ P☐**

Comment [k26]: 5. Demonstration that the measure is superior to competing measures – new submissions and/or endorsed measures (e.g., is a more valid or efficient way to measure).

Comment [KP27]: 4a. For clinical measures, required data elements are routinely generated concurrent with and as a byproduct of care processes during care delivery. (e.g., BP recorded in the electronic record, not abstracted from the record later by other personnel; patient self-assessment tools, e.g., depression scale; lab values, meds, etc.)

Comment [KP28]: 4b. The required data elements are available in electronic sources. If the required data are not in existing electronic sources, a credible, near-term path to electronic collection by most providers is specified and clinical data elements are specified for transition to the electronic health record.

Comment [KP29]: 4c. Exclusions should not require additional data sources beyond what is required for scoring the measure (e.g., numerator and denominator) unless justified as supporting measure validity.

Comment [KP30]: 4d. Susceptibility to inaccuracies, errors, or unintended consequences and the ability to audit the data items to detect such problems are identified.

Comment [KP31]: 4e. Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, etc.) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use).

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: This measure is a claims-based measure using CMS hospital outpatient claims data. There was a significant change in coding that took place after the implementation of the outpatient prospective payment system (OPPS) beginning in calendar year 2000. This occurred as there was a change from using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9) procedure codes during the cost-based reimbursement system prior to OPPS to the Healthcare Common Procedure Coding System (HCPCS) codes and the ambulatory payment classification (APC) fee schedule after implementation of OPPS. HCPCS are used by Medicare and maintained by the CMS. They are based on the CPT (Current Procedural Technology) codes developed by the American Medical Association. The change to HCPCS does not seem to become fully implemented until mid-year 2002. The measure development team chose 2007 as the most recent year of available complete data to support the analysis. Special attention needs to be taken when counting procedures on the Medicare claims files. The biggest issue is how to deal with modifier codes. Modifiers are two digit indicators (alpha or numeric) that represent a service or procedure that has been altered by some specific circumstance, which typically will impact the payment amount. Procedure modifier code "26" represents the professional component of a procedure and includes the clinician work (i.e., the reading of the image by a physician), associated overhead and professional liability insurance costs. This modifier corresponds to the human involvement in a given service or procedure. The procedure modifier code "TC" represents the technical component of a service or procedure and includes the cost of equipment and supplies to perform that service or procedure. This modifier corresponds to the equipment/facility part of a given service or procedure. In most cases, unmodified codes represent a global procedure which includes both the professional and technical components. There are also other modifier codes. All other modifier codes have been counted as a technical code for our purposes. When calculating the measures, we are only concerned with procedures associated with technical and global modifiers, as these modifiers refer to services provided by the facility. This reduces the possibility of double-counting procedures, since a single procedure may result in both a technical and professional record on the claims files. There were very few instances when this occurred as it related to procedures applicable to the measures. When developing counts of procedures, the objective is to avoid double-counting procedures that may have been billed through multiple revenue centers within a facility. Billing through multiple centers leads to multiple records in the Medicare claims files (i.e., the SAFs). For instance, there may be multiple bills for a single CT with contrast. On one bill, the charges relate to the application of a radiopharmaceutical, which could have a technical modifier code and come from the pharmacy revenue center. On the other bill, the charges relate to the imaging study and may fall under a technical bill from the imaging center revenue center. In this case, we only count the CT scan once, since only one CT scan was performed. However, if we were summing up the Medicare paid amounts for this procedure, we would include the Medicare paid amounts from both bills, as they each represent payments for services directly related to the particular CT scan. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** These measures are based on administrative claims data. For providers, there is no additional data collection required to support these measures and therefore no additional cost. 4e.3 **Evidence for costs:** Not applicable. 4e.4 **Business case documentation:** Not applicable.	**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**
Centers for Medicare & Medicaid Services | 7500 Security Blvd | Baltimore | Maryland | 21244-1850

Co.2 **Point of Contact**
Susan | Arday, BSPH, MHS, CHES | susan.arday@cms.hhs.gov | 410-786-3141

Measure Developer If different from Measure Steward
Co.3 **Organization**
The Lewin Group | 3130 Fairview Park Drive, Suite 800 | Falls Church | Virginia | 22042

Co.4 **Point of Contact**
Charlie | Bruetman, MD, MBA | charlie.bruetman@lewin.com | 703-269-5569

Co.5 **Submitter If different from Measure Steward POC**
Sharman | Stephens, BSN, MPH, RN | sharman.stephens@lewin.com | 703-269-5575- |The Lewin Group

Co.6 **Additional organizations that sponsored/participated in measure development**
The Lewin Group worked with subcontractors National Imaging Associates, Inc. (NIA) and Dobson|DaVanzo, LLC to develop the measures. The following individuals from each organization contributed to the measures development process

NIA
Staci L. Barnett
Director, Research and Analysis
Magellan Health NIA

Thomas G. Dehn, MD, FACR
Executive Vice President, Chief Medical Officer
National Imaging Associates, Inc

Kariena Greiten
SVP, Product Innovation
National Imaging Associates

Michael J. Pentecost, MD
Associate Chief Medical Officer
Magellan Health NIA

Dobson|DaVanzo, LLC
Joan DaVanzo, PhD, MSW

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.
The technical expert panel (TEP) consisted of the following individuals:

Augustine E. Agocha, MD, PhD, MBA
Chief of Cardiology and Chairman
Department of Cardiovascular Medicine
Deborah Heart and Lung Hospital Center
Clinical Associate Professor of Medicine
University of Medicine and Dentistry
Robert Wood Johnson Medical School

Thomas Ebert, MD
Health New England
Chief Medical Officer

Frank J. Rybicki MD, PhD
Dir, Cardiac CT & Vascular CT/MRI
Dir, Applied Imaging Sciences Laboratory
Brigham and Women's Hospital
Assoc Prof, Harvard Medical School

John Freedman, MD, MBA
Principle, Freedman HealthCare LLC

John Eng, MD
Associate Professor of Radiology
Joint Appointment in Health Sciences Informatics Department of Radiology and Radiological Science
Johns Hopkins University School of Medicine

Bruce J. Hillman, MD, FACR
Editor in Chief
American Journal of Radiology

Robert Haralson III, MD, MBA
Medical Director of DeRoyal Industries

Paul R. Sierzenski, MD, RDMS FACP
Director, Emergency, Trauma and Critical Care Ultrasound
Director, Emergency Ultrasound Fellowship
Department of Emergency Medicine
Christiana Care Health System
Associate Professor, Emergency Medicine
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Jeffrey K. Levin-Scherz, MD, MBA
Principal, Towers Perrin

Gregory M. Kusiak, MBA
President
California Medical Business Services, Inc

Allyson Ross Davies, PhD, MPH
Principal
ARD Consulting LLC

Barbara McNeil, MD, PhD

Ridley Watts Professor and Head
Professor of Radiology
Department of Health Care Policy
Harvard University

Pamela S. Douglas MD, MACC, FASE, FAHA
Ursula Geller Professor of Research in Cardiovascular Diseases
Director, DCRI CV Imaging Program
Duke University

Michael Hutchinson, MD, PhD
Associate Professor of Neurology
Diplomate, Neuroimaging
Diplomate, American Board of Psychiatry and Neurology
New York University School of Medicine

The TEP met once in October 2008 to determine which of the proposed imaging efficiency measures the measures development team should pursue for NQF endorsement. Following the TEP meeting, TEP members were consulted on an individual basis depending on their area of expertise to clarify technical issues surrounding and provide recommendations regarding the measures under development. A second TEP meeting was held in October 2009 to provide the results of data analysis for each proposed measure. During this meeting the TEP provided additional feedback and the measure specifications were adjusted accordingly.

Ad.2 **If adapted, provide name of original measure:** Not applicable.
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:**
Ad.7 **Month and Year of most recent revision:**
Ad.8 **What is your frequency for review/update of this measure?** Annually
Ad.9 **When is the next scheduled review/update for this measure?** 2010-08

Ad.10 **Copyright statement/disclaimers:**

Ad.11 -13 **Additional Information web page URL or attachment:** URL LOGIN: CMS.2009 PASSWORD: OIE2009= ftp.lewin.com This secure FTP site is available Monday through Friday from 7:30 AM – 9:00 PM (EST). If using Internet Explorer 7 or 8 please follow previous instructions.

Date of Submission (*MM/DD/YY*)**:** 05/17/2010

NQF Supplemental Materials:

Preoperative Cardiac Imaging for Low-Risk Surgery

Outpatient Imaging Efficiency (OIE)

Prepared for:

Centers for Medicare & Medicaid Services (CMS)

Submitted by:

The Measure Development Team

The Lewin Group, Inc.
Dobson DaVanzo & Associates, LLC
National Imaging Associates, Inc.

1. Background Statistics

Single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI) is the most utilized advanced imaging procedure, (defined as computed tomography, magnetic resonance imaging or nuclear medicine studies), with over 2 million procedures being conducted annually across all settings.[1] During our initial stages of the measure development process it became apparent that cardiac imaging was a gap area that had not been addressed in the first set of CMS OIE measures or by other measure development efforts.

Exhibit 1 describes the 2002 through 2008 trend in billing for single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI), stress echocardiography, and stress (Magnetic Resonance Imaging) MRI. SPECT MPI studies are by far the most common during this time period. In general though, there is a downward trend in the utilization of these stress tests from 2002 through 2008 in hospital outpatient departments.[2] Across all procedures listed, there was a 9.1 percent decrease in utilization during this timeframe.

Exhibit 1: Trends in Stress Tests from the Medicare Outpatient Hospital Standard Analytical Files: 2002 through 2008

Stress CPT		2002	2003	2004	2005	2006	2007	2008	Percent Change 2002-2008
78464	MPI, SPECT, Single, At Rest or Stress	55,990	54,585	54,143	48,482	40,925	33,509	28,455	-49.2%
78465	MPI, SPECT, Multiple, At Rest and/or Stress	646,540	652,873	697,602	687,540	660,866	621,533	603,384	-6.7%
93350	Echocardiography, transthoracic, real time with image documentation, during rest and cardiovascular stress test using treadmill, bicycle exercise and/or pharmacologically induced stress with interpretation and report	136,321	140,994	148,964	146,351	141,724	135,670	122,168	-10.4%
75559	MRI with stress/imaging	0	0	0	0	0	0	87	NA
75560	MRI with flow/ velocity/ stress	0	0	0	0	0	0	26	NA
75563	MRI with stress imaging and dye	0	0	0	0	0	0	746	NA
75564	MRI with flow/velocity/ stress and dye	0	0	0	0	0	0	68	NA
C8928	(New for FY 2009) - Stress echo with contrast	0	0	0	0	0	0	7,485	NA
All Procedures		838,851	848,452	900,709	882,373	843,515	790,712	762,419	-9.1%

Notes: NA = Not Available.

[1] Lewin analysis of the Medicare FFS claims data.

[2] This trend is consistent with findings reported by the US Government Accountability Office (GAO) findings of a shift in provision of imaging services from hospitals to physician offices. GAO, "Medicare Part B Imaging Services: Rapid Spending Growth and Shift to Physician Offices Indicate Need for CMS to Consider Additional Management Practices," GAO-08-452, June 2008.

There was also a small decrease in MPI, SPECT, Single, At Rest or Stress (78464) and Stress Echo (93350) of 6 percent and 4 percent during 2002 through 2006 in the physician office setting. However, these decreases are more than offset by a large increase (57 percent) in the use of MPI, SPECT, Multiple, At Rest and/or Stress (78465) in the physician office setting. [3]

The codes 75559, 75560, 75563, 75564 and C8928 were new codes beginning in calendar year 2008, which is why there is only utilization for the one year.

The number of non-cardiac surgeries has progressively increased over the past twenty years,[4] with elderly patients undergoing at least four million major non-cardiac operations annually.[5] **Exhibit 2** presents common non-cardiac low-risk surgeries in the outpatient hospital setting for the Medicare population.

Exhibit 2: Number of Medicare Outpatient Hospital Low-Risk Surgeries: 2007

Ranking	CPT/ ICD9[a]		Number of Cases
Outpatient Hospital			
1	43239	Upper GI endoscopy, biopsy	576,579
2	45378	Diagnostic colonoscopy	501,270
3	45380	Colonoscopy and biopsy	415,110
4	45385	Lesion removal colonoscopy	308,173
5	43235	Upper GI endoscopy, diagnosis	159,092
6	45384	Lesion remove colonoscopy	148,988
7	52000	Cystoscopy	88,795
8	66821	After cataract laser surgery	66,168
9	19103	Bx breast percut w/device	52,703
10	43249	Esoph endoscopy, dilation	52,459

[3] The physician office visit trends are based on The Lewin Group analysis of the 2002 through 2006 Part B Physician/ Supplier Procedure Summary Master Record files.

[4] Hernandez AF, Newby KI, O'Connor CM. Preoperative evaluation for major non-cardiac surgery. Arch Intern Med. 2004; 164: 1729 –1736.

[5] Gregoratos G. Current guideline-based preoperative evaluation provides the best management of patients undergoing noncardiac surgery. Circulation 2008; 117(24): 3134-44. *Citing*: National Center for Health Statistics. Health, United States 2006: inpatient surgery. November 2006. Available at: http://www.cdc.gov/nchs/fastats /insurg.htm.

2. Measure Ratios and Descriptive Statistics

Exhibit 3 displays the descriptive statistics related to the Preoperative Cardiac Imaging for Low-Risk Surgery measure. The measure ratio ranged from a minimum value of 0.000 to a maximum of 0.0778 with a weighted average ratio of 0.0054. Ten percent of the 3,266 hospitals that met our minimum case count requirements had a measure ratio above 0.0129; 5 percent of the hospitals had a ratio above 0.0170, and 1 percent of hospitals had a ratio above 0.0289. **Exhibit 4** displays the distribution of facilities related to the Preoperative Cardiac Imaging for Low-Risk Surgery measure.

Exhibit 3: Descriptive Statistics for Preoperative Cardiac Imaging for Low-Risk Surgery Measure (n = 3,266)*

Statistic	Denominator	Numerator	Ratio
Standard Deviation	709.1	7.48	0.0064
Weighted Average** (i.e., a national measure)	675.0	3.62	0.0054
Coefficient of Variation	1.05	2.07	1.289
Minimum	45	0	0
1st Percentile	54	0	0
5th Percentile	83	0	0
10th Percentile	116	0	0
25th Percentile	225	0	0
Median	467	1	0.0030
75th Percentile	869	4	0.0075
90th Percentile	1,497	9	0.0129
95th Percentile	1,947	13	0.0170
99th Percentile	3,489	27	0.0289
Maximum	9,365	222	0.0778

*n = Number of facilities
**Weighted Average adjusts for case volumes at the facility level

Exhibit 4: Distribution of Facilities for Preoperative Cardiac Imaging for Low-Risk Surgery Measure: 2007

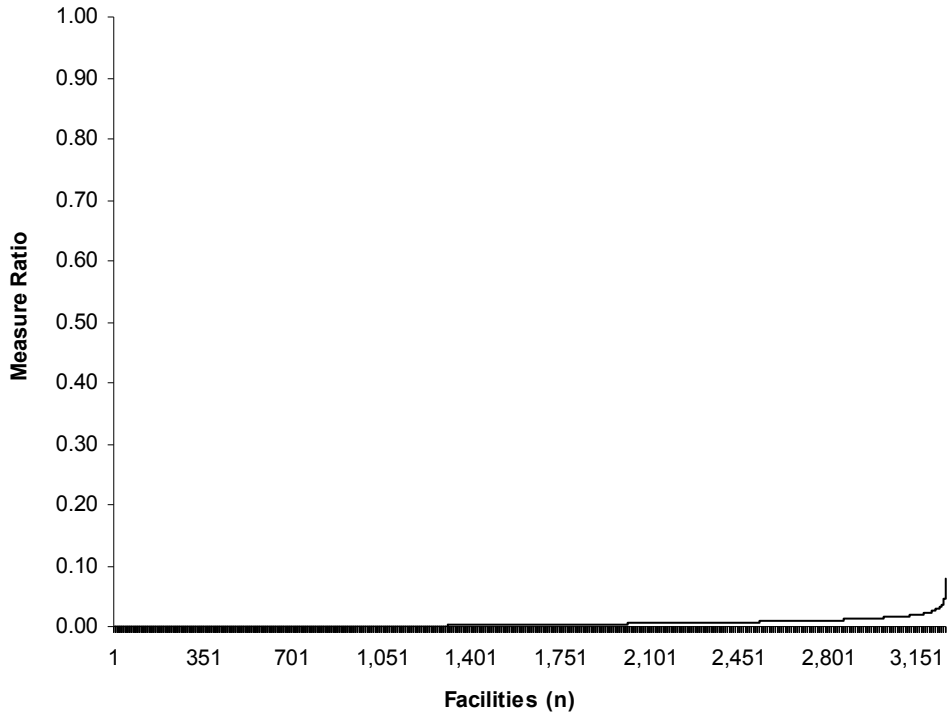


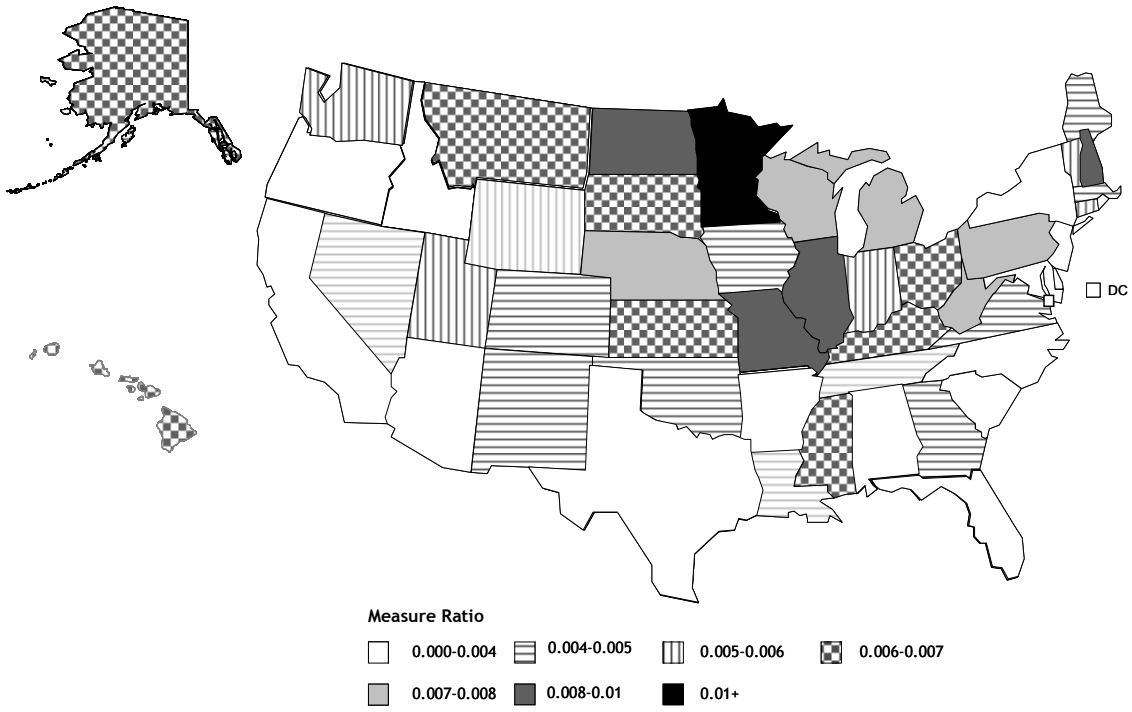
Exhibit 5 presents the Preoperative Cardiac Imaging for Low-Risk Surgery measure ratios by geographic area, teaching status, and bed size cohorts. Compared to rural areas (average ratio of 0.0067), hospitals in urban areas have a slightly lower ratio at 0.0050. In terms of teaching status (i.e., teaching versus non-teaching) hospitals had the same measure ratios (average ratio of 0.0051); however major teaching hospitals had a slightly higher ratio (average ratio of 0.0067). Further, with the exception of the 51-100 bed size hospitals (average ratio 0.0066) the measure ratio was approximately the same for hospitals of different bed size, ranging from 0.0051 to 0.0053.

Exhibit 5: Preoperative Cardiac Imaging for Low-Risk Surgery Measure Ratios by Geographic Area, Teaching Status, and Bed Size Cohorts: 2007

Characteristic	Ratio
United States	0.0054
Geographic Area	
Rural	0.0067
Urban	0.0050
Teaching Status	
Non-Teaching	0.0051
Teaching	0.0051
Major Teaching	0.0067
Bed Size	
0 - 50	0.0053
51 - 100	0.0066
101 - 250	0.0051
251 - 500	0.0053
Greater than 500	0.0053

Exhibit 6 displays the state level variation for the Preoperative Cardiac Imaging for Low-Risk Surgery measure. By state, the measure ratios range from 0.0003 in Maryland to 0.0111 in Minnesota.

Exhibit 6: State Level Variation in Preoperative Cardiac Imaging for Low-Risk Surgery Measure: 2007



Measure #/Title/Steward

IEP-010-10 Preoperative Evaluation for Low-Risk Non-Cardiac Surgery Risk Assessment/CMS

Description

This measure calculates the percentage of low-risk, non-cardiac surgeries performed at a hospital outpatient facility with a stress echocardiography, SPECT MPI or Stress MRIO study performed in the 39 days prior to the surgery at a hospital outpatient facility (e.g., endoscopic, superficial, cataract surgery, and breast biopsy procedures). Results are to be segmented and reported by hospital outpatient facility where the imaging procedure was performed.

Initial In-person Vote

THE STEERING COMMITTEE VOTED ON THE MEASURE VIA AN ONLINE SURVEY – THE STEERING COMMITTEE WILL VOTE ON THE MEASURE AFTER THE MEASURE DEVELOPER HAS RESPONDED TO THE CONDITIONS FOR RECOMMENDATION.

Steering Committee Questions/Conditions for Measure Developer:	Abbreviated Response from Measure Developer:
* The measure is still under review by the Steering Committee. Questions or conditions surrounding the measure will be forwarded to the measure developer once the Steering Committee had made a decision on how to proceed forward with the measure.	• CMS has collaborated with ACC to harmonize the list of low-risk surgeries.

Detailed Response from Measure Developer:

The Steering Committee is interested in harmonizing this measure with the American College of Cardiology (ACC) measure for low-risk surgery. As such, CMS has revised the list of included low-risk surgeries based on Steering Committee member questions about the inclusion of two procedures. The categories for low-risk surgery were originally taken from the ACC Appropriateness Criteria for SPECT MPI, including endoscopic procedures, superficial procedure, cataract surgery, and breast biopsy. Although the ACC Appropriateness Criteria did not contain specific information (i.e., codes) beyond the above listed categories, the measure developer identified the CPT codes of procedures falling into the above categories. This list of codes was reviewed by physician consultants and the TEP. Per the request of the primary reviewers, the list was shared with ACC in order for CMS and ACC to harmonize the low-risk surgeries that should be included in the measure. CMS and ACC discussed the list and believe the detailed CMS list is now in alignment with the ACC broader categories listing included in ACC guidelines. The CMS revised list can be found as an attachment.