NATIONAL QUALITY FORUM

TO: NQF Members and Public

FR: NQF Staff

RE: Pre-voting review for *National Voluntary Consensus Standards for Imaging Efficiency: A Consensus Report*

DA: May 28, 2010

This is the draft report from NQF's Imaging Efficiency project, which is a follow-up to the Outpatient Imaging Efficiency project completed in November 2008. NQF's follow-up Imaging Efficiency project sought to address additional measures concerned with imaging efficiency in the outpatient setting. A Steering Committee of 22 individuals representing a diverse range of stakeholder perspectives reviewed and considered for endorsement a total of 17 candidate imaging efficiency standards. This draft report recommends seven measures be considered for endorsement.

The draft document, *National Voluntary Consensus Standards for Outpatient Imaging Efficiency: A Consensus Report,* is also posted on the NQF website, http://www.qualityforum.org/projects/imaging_efficiency.aspx#t=1&p=&s=, along with the following additional information:

- measure submission forms and accompanying technical documents;
- measure evaluation documents with the Steering Committee's conditions for recommendation and measure developer responses; and
- meeting and call summaries for the Steering Committee.

Pursuant to section II.A of the Consensus Development Process v. 1.8, this draft document, along with the accompanying material, is being provided to you at this time for purposes of review and comment only—not voting. You may post your comments and view the comments of others on the NQF website.

NQF Member comments must be submitted no later than 6:00 pm ET, June 28, 2010.

Public comments must be submitted no later than 6:00 pm ET, June 21, 2010.

NQF is now using a program that facilitates electronic submission of comments on this draft report. **All comments must be submitted using the online submission process.**

Supporting documents related to your comments may be submitted by **e-mail** to imagingefficiency2@qualityforum.org, with "*Comment – Imaging Efficiency*" in the subject line and your contact information in the body of the e-mail.

Thank you for your interest in NQF's work. We look forward to your review and comments.

NATIONAL QUALITY FORUM

NATIONAL VOLUNTARY CONSENSUS STANDARDS FOR OUTPATIENT IMAGING EFFICIENCY

DRAFT REPORT

MAY 28, 2010

NATIONAL QUALITY FORUM

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EXECUTIVE SUMMARY

According to the Centers for Medicare and Medicaid Services (CMS), expenditures on healthcare costs have continued to escalate at rates that far outpace inflation. Recent data from CMS shows expenditures on healthcare in the United States are projected to surpass $2.5 trillion in 2009, more than three times spent in 1990. By 2019, CMS projects national health spending will reach $4.5 trillion and comprise 19.3 percent of the U.S. gross domestic product (GDP), though it is unclear that this increased spending will yield improved health outcomes.

Outpatient imaging is a critical component of today's healthcare delivery system, with important applications in establishing diagnoses, prognosis, and monitoring therapy. Despite the benefits of imaging technology, recent reports from the Government Accountability Office (GAO) point to the need for caution as we witness immense growth in the volume and intensity of imaging services. Research from the GAO's 2008 Annual Report state within Medicare alone, expenditures for imaging services more than doubled from 2000 to 2006. Further, the number of imaging services provided varied substantially (up to three-fold) across the country, signaling the potential presence of overuse.

To achieve quality and improve the efficiency in the delivery of imaging services, there is a need to publicly report measures on the appropriate and efficient use of imaging procedures in outpatient settings. The goal of this consensus standards project is to promote the appropriate use of outpatient imaging services, thus, avoiding redundancy and unnecessary exposure to radiation, reducing the use of painful and wasteful follow-up procedures, and ensuring that patients get the right healthcare service the first time.

To date, NQF has endorsed a limited number of imaging efficiency measures focused on the appropriateness or efficiency of imaging services. The current imaging efficiency project seeks to bolster the 2009 report by identifying and endorsing additional measures related to the

appropriateness and efficiency of outpatient imaging at the clinician and facility levels for public reporting and quality improvement.

This report presents 7 NQF-endorsed® consensus standards and a number of research and measure development recommendations regarding the appropriateness and efficiency of outpatient imaging services.

- IEP-005-10 Pulmonary CT imaging for patients at low risk for pulmonary embolism
- IEP-007-10 Appropriate head CT imaging in adults with mild traumatic brain injury
- IEP-010-10 Cardiac Imaging for Preoperative Risk Assessment for Non-Cardiac Low-Risk Surgery
- IEP-013-10 Use of brain computed tomography (CT) in the emergency department (ED) for atraumatic headache
- IEP-014-10 Cardiac stress imaging not meeting appropriate use criteria: preoperative evaluation in low risk surgery patients
- IEP-015-10 Cardiac stress imaging not meeting appropriate use criteria: routine testing after percutaneous coronary intervention (PCI)
- IEP-016-10 Cardiac stress imaging not meeting appropriate use criteria: testing in asymptomatic, low risk patients

NATIONAL QUALITY FORUM

NATIONAL VOLUNTARY CONSENSUS STANDARDS FOR OUTPATIENT IMAGING EFFICIENCY

BACKGROUND

Healthcare costs have continued to escalate at rates that far outpace inflation. Expenditures on healthcare in the United States are projected to surpass $2.5 trillion in 2009, more than three times that spent in 1990.[1] Current projections estimate that by 2019, national health spending will reach $4.5 trillion and comprise 19.3 percent of GDP,[2] though it is unclear that this increase will yield improved health outcomes.

Outpatient imaging is a critical component of today's healthcare delivery system, with important applications in establishing diagnoses and prognoses and monitoring therapy. Cutting-edge imaging technologies help diagnose and treat life-threatening disease, such as cancer, allow for earlier diagnosis, and reduce the need for more invasive surgical or other procedures. Despite the benefits of imaging technology, recent reports point to the need for caution as the volume and intensity of services experience a boom in growth without proof of desirable patient outcomes.[3]

A core challenge for policy makers and providers of care is how to increase quality and improve the efficiency of the delivery system. Imaging services represent a major cost driver of today's healthcare delivery system with recent trends in imaging practices and cost growth gaining national attention. In 2008, two-thirds of spending on imaging services occurred in a physician office setting indicating a shift away from the provision of such services from the traditional hospital or other institutional based setting.[4] This shift signals a need for measures of quality and efficiency to reflect the changing care setting. Despite a reversal in spending for physician imaging services in 2007 by 12.7 percent from 2006, Medicare spending on advanced medical imaging modalities (computed tomography, magnetic resonance imaging and nuclear medicine) continues to grow at a rapid rate when compared to the growth of spending among less advanced imaging modalities (ultrasound and X-rays).[5] Furthermore, the MedPAC report found that the number of imaging services provided varied substantially (up to three-fold) across the country, signaling the potential presence of overuse.[6] Despite the important role of outpatient

imaging, few national standards exist to address variations in delivery practices, define quality outcomes related to the use of imaging, or allow for the measurement of these services.

To achieve quality and improve the efficiency in the delivery of imaging services, there is a growing need to publicly report measures on the appropriate and efficient use of imaging procedures in outpatient settings. The goal of this consensus standards project is to promote the appropriate use of outpatient imaging services, thus avoiding redundancy and unnecessary exposure to radiation, reducing the use of painful and wasteful follow-up procedures, and ensuring that patients get the appropriate healthcare service the first time. These strategies have the potential to improve both the quality and affordability of healthcare.

Efficiency has historically been difficult to measure, with varying definitions of "efficiency" further compounding the healthcare arena's adoption of or move to efficiency standards. Most recently, a report prepared for the Agency for Healthcare Research and Quality (AHRQ) on the typology of efficiency measures defined efficiency as an attribute of performance that is measured by examining the relationship between a specific product of the healthcare system (an output) and the resources used to create that product (an input).[7] This definition allows for the health service outputs to be defined with reference to quality criteria. The National Quality Forum (NQF) Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care, which predated the AHRQ prepared report, adopted the Ambulatory Care Quality Alliance (AQA) definition for efficiency and further emphasized that the purpose of the healthcare delivery system is "to improve health, reduce the burden of illness, and maximize the value of individual and societal resources allocated to health care."[8]

Assessing the quality and value of care delivered in relation to resources used is vital when evaluating efficiency. Practices or procedures that consume fewer resources but yield a lower quality or value of care may be considered inefficient compared to those practices or procedures that use more resources but produce a higher quality and value of care.

STRATEGIC DIRECTIONS FOR NQF

NQF's mission includes three parts: 1) setting national priorities and goals for performance improvement, 2) endorsing national consensus standards for measuring and publicly reporting on performance, and 3) promoting the attainment of national goals through education and outreach programs. As greater numbers of quality measures are developed and brought to NQF for consideration of endorsement, it is incumbent on NQF to assist stakeholders to "measure what makes a difference" and address what is important to achieve the best outcomes for patients and populations. For more information see www.qualityforum.org/projects/imaging_efficiency.aspx.

Several strategic issues have been identified to guide consideration of candidate consensus standards:

DRIVE TOWARD HIGH PERFORMANCE. Over time, the bar of performance expectations should be raised to encourage achievement of higher levels of system performance.

EMPHASIZE COMPOSITES. Composite measures provide much needed summary information pertaining to multiple dimensions of performance and are more comprehensible to patients and consumers.

MOVE TOWARD OUTCOME MEASUREMENT. Outcome measures provide information of keen interest to consumers and purchasers, and when coupled with healthcare process measures, they provide useful and actionable information to providers. Outcome measures also focus attention on much-needed system-level improvements, since achieving the best patient outcomes often requires carefully designed care process, teamwork, and coordinated action on the part of many providers.

CONSIDER DISPARITIES IN ALL THAT WE DO. Some of the greatest performance gaps relate to care of minority populations. Particular attention should be focused on identifying disparities-sensitive performance measures and on identifying the most relevant race/ethnicity/language strata for reporting purposes.

NATIONAL PRIORITIES PARTNERSHIP

NQF seeks to endorse measures that address the National Priorities and Goals of the NQF-convened National Priorities Partnership. The National Priorities Partnership represents those who receive, pay for, provide, and evaluate healthcare. The National Priorities and Goals focus on these areas:

- patient and family engagement,
- population health,
- safety,
- care coordination,
- palliative and end-of-life care, and
- overuse.

NQF AND THE EFFICIENCY LANDSCAPE

In 2007, NQF took the initial steps in standardizing measures to address the appropriateness of diagnostic imaging services with the endorsement of five voluntary consensus standards. The project endorsed three measures for the appropriate use of imaging services for low back pain and two measures for use of imaging for patients with stroke. In April 2008, NQF launched the first NQF Outpatient Imaging Efficiency Project to further address appropriate and efficient use of diagnostic imaging in the outpatient setting. The project endorsed eight imaging efficiency measures at the practitioner and facility level that relate to the appropriateness and efficiency of imaging services, including both the cost of imaging services and the related quality of care.[9]

In 2009, NQF published the report *Measurement Framework: Evaluating Efficiency Across Patient-Focused Episodes of Care*. The report produced the NQF-endorsed® measurement framework for evaluating efficiency and ultimately value, across patient-focused episodes of care. The report ultimately produced nine guiding principles to be applied when evaluating efficiency within the healthcare system. Specifically:

- Principle 1: Efficiency measurement is multidimensional.
- Principle 2: Choice of measures to inform judgment on efficiency should include consideration of potential leverage.
- Principle 3: Measures used to inform judgment on efficiency should promote shared accountability across providers and should be assigned to the smallest unit of accountability as technically feasible.
- Principle 4: Measures used to inform judgments on efficiency should respond to the need to harmonize measurement across settings of care.
- Principle 5: Measures to inform judgments on efficiency should be used for benchmarking.
- Principle 6: Public reporting of measures of efficiency should be meaningful and understandable to consumers and entities accountable for their care.
- Principle 7: Inappropriate care cannot be efficient.
- Principle 8: The measurement framework should achieve its intended purpose and should be monitored for unintended consequences.
- Principle 9: Measures to inform judgments on efficiency should be an integral part of a continuous learning system.

The National Priorities Partnership, of which NQF is a convener and one of the 32 members, set a national agenda for efficiency when it delineated the reduction in waste as one of four major challenges important to improving the American healthcare system. The Partnership identified six priority areas critical to improving the quality and value of the healthcare delivery system, one of which focuses on the elimination of overuse while ensuring the delivery of appropriate care.

The Partnership report targeted specific areas of potential unwarranted diagnostic procedures, including:

- cardiac computed tomography (noninvasive coronary angiography and coronary calcium scoring);

- lumbar spine magnetic resonance imaging prior to conservative therapy, without red flags;
- uncomplicated chest/thorax computed tomography screening;
- bone or joint x-ray prior to conservative therapy, without red flags; and
- chest x-ray, preoperative.

To date, NQF has endorsed a limited number of imaging efficiency measures focused on the appropriateness or efficiency of imaging services. The current imaging efficiency project seeks to bolster the 2009 report, by identifying and endorsing additional measures related to the appropriateness and efficiency of outpatient imaging at the clinician and facility levels for public reporting and quality improvement. While the imaging field is expansive, the scope of this project focused on imaging efficiency in the outpatient setting. Specific outpatient imaging efficiency measurement domains central to this project included:

- screening;
- patient safety;
- negative studies;
- noncontrast imaging of the same body part using same imaging modality followed by, but on a separate occasion, with contrast imaging of adjacent body parts;
- coordination of care;
- overlap; and
- duplication.

SCOPE OF THE IMAGING EFFICIENCY PROJECT

NQF's National Voluntary Consensus Standards for Imaging Efficiency project[13] seeks to indentify and endorse measures for public reporting and quality improvement related to resource use and care coordination for outpatient imaging.

NQF'S CONSENSUS DEVELOPMENT PROCESS (CDP)

Evaluating Potential Consensus Standards

Candidate standards were solicited through an open Call for Measures in December 2009 and searched through the National Quality Measures Clearinghouse. A total of 17 measures were submitted to the project and evaluated by the Outpatient Imaging Efficiency Steering Committee for appropriateness as voluntary consensus standards for accountability and public reporting. The Steering Committee evaluated the candidate consensus standards using NQF's standard evaluation criteria: importance, scientific acceptability, usability, and feasibility. (See the NQF Development Process page for more details on evaluating potential consensus standards. http://www.qualityforum.org/uploadedFiles/Quality_Forum/Measuring_Performance/Consensus_Development_Process%E2%80%99s_Principle/EvalCriteria2008-08-28Final.pdf?n=4701.)

This report presents the 17 performance measures that were submitted to NQF for endorsement. They comprise the following areas:

- appropriateness of imaging, including measures that address potential overuse of certain imaging studies and appropriateness of referrals for imaging;
- efficient use and management of imaging diagnostic services (e.g., x-ray, magnetic resonance imaging, tomography, mammography);
- coordination of care and communication among all providers/departments regarding a diagnostic imaging service, including the appropriateness of the study and timely follow-up of abnormal results; and
- measures suitable for clinician and facility-level analysis.

RECOMMENDATIONS FOR ENDORSEMENT

This report presents the results of the evaluation of 17 measures considered under NQF's CDP. Seven measures are recommended for endorsement as National Voluntary Consensus Standards suitable for public reporting and quality improvement.

Candidate Consensus Standards Recommended for Endorsement

IEP-005-10 Pulmonary CT imaging for patients at low risk for pulmonary embolism (Brigham and Women's Hospital) *Percent of patients undergoing CT pulmonary angiogram for the evaluation of possible PE who have a documented indication consistent with guidelines prior to CT imaging.*

This clinician, facility, or population level measure assesses the rate of patients undergoing CT pulmonary angiogram (CTPA) for the evaluation of possible PE, who have a documented indication consistent with guidelines prior to the actual CT imaging. Every year, over ten million people in the United States present with chest pain or breathing difficulties, the main symptom of PE.[10] While exact prevalence of PE is unknown, evidence suggests that 1 in every 500 to 1 in every 1000 emergency department (ED) patients has a PE.[11] Recent advancement in technology, including D-dimer serological testing and CTPA have resulted in significant changes in U.S. practice with CTPA being considered the definitive test for PE.[12] This measure aims to improve imaging efficiency within the outpatient setting by reducing the inappropriate ordering of CTPA for pulmonary embolisms, by guiding clinical practice towards the use of initial D-dimer testing rather than deferring immediately to CTPA for suspicion of a PE. In addition to improving efficiency, the measure also has tangible implications for patient safety as ionizing radiation from CTPA can increase the lifetime risk of cancer, particularly in young women.[13]

The Steering Committee acknowledged the value of the measure and believed it was best suited as an "overuse" measure rather than strictly as an "efficiency" measure. In changing the measure to an overuse measure the developer was able to amend the numerator specifications, specifically relating to the D-dimer. According to the Steering Committee's recommendations the measure developer updated the numerator specifications to read: "number of hemodynamically stable

patients who receive CT pulmonary angiograms for suspected pulmonary embolism who have either:

- a low clinical probability of PE and a negative D-dimer

OR

- a low clinical probability of PE and no D-dimer performed

OR

- no documentation of a pre-test probability."

The Committee was agreeable to the update and noted the importance of requiring a pre-test probability score as part of the pre-test assessment to prevent any gaming, because those who do not perform a pre-test risk assessment would not be measured.

The Steering Committee noted challenges in the feasibility of the measure as specified because it was based on a proprietary electronic data collection tool used at the Brigham and Women's Hospital. The measure developers consequently specified a paper data collection tool to accompany the measure and be made available to the public. The Committee felt the measure was of great value and would help improve the efficiency of pulmonary CT imaging. Because the paper data collection tool as specified has not been tested, the Steering Committee recommended the measure for time-limited endorsement.

IEP-007-10 Appropriate head CT imaging in adults with mild traumatic brain injury (Brigham and Women's Hospital) *Percent of adult patients who presented within 24 hours of a non-penetrating head injury with a Glasgow coma score (GCS) >13 and underwent head CT for trauma in the ED who have a documented indication consistent with guidelines prior to imaging.*

This clinician, facility, or population level measure aims to evaluate the rate of adult patients presenting to the ED within 24 hours of a non-penetrating head injury with a Glasgow coma score (GCS) >13, who underwent head CT for trauma and who have a documented indication consistent with guidelines prior to imaging. The measure uses the American College of Emergency Physicians and the Centers for Disease Control and Prevention guideline, "*Clinical policy: neuroimaging and decision-making in adult mild traumatic brain injury in the acute*

setting" (2008).[14] Head injuries represent a common complaint in U.S. EDs, comprising more than 1.8 million cases annually in the ED setting.[15] As technologies have improved and access to CTs has increased, CTs are increasingly used for the evaluation of minor head injuries. This increased use of head CTs for minor head injuries or in low risk patients adds a significant cost to the healthcare system, while yielding few results as a CT scan has only minimal ability to detect intracranial injury in a low risk patient.[16] Despite the significant cost, variations in the use of CT scans have been identified.[17] This measure aims to use previously standardized and evidence-based clinical decisions to reduce unnecessary CT scans and improve imaging efficiency in the ED setting.

The Steering Committee agreed that the measure is based on strong evidence-based guidelines and targets a critical imaging practice in the ED setting. The Committee initially debated about the inclusion criteria of GCS >13 (as specified) and alternative inclusion criteria of GCS ≥13. The measure developer responded with a rationale for the GCS>13 criteria being representative of the most recent evidence-based guidelines, to which the Committee was agreeable.

As with other measures submitted by the Brigham and Women's Hospital, the Steering Committee had concerns regarding the feasibility of the measure as it is based on a proprietary electronic system. The measure developer supplied a paper format of the data collection tool to be used at facilities without the proprietary electronic system. While the paper format presents some challenges, specifically regarding the feasibility of the measure, the Committee felt the measure was of great value and would help improve the efficiency of head CT imaging. Because the paper data collection tool as part of the specification has not been tested, the Steering Committee recommended the measure for time-limited endorsement.

IEP-010-10 Cardiac Imaging for Preoperative Risk Assessment for Non-Cardiac Low-Risk Surgery (Centers for Medicare and Medicaid Services) *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.*

This facility or population level measure assesses the rate of low risk, non-cardiac surgeries performed at a hospital outpatient facility where a stress echocardiography, single photon emission computed tomography (SPECT) myocardial perfusion imaging (MPI) or stress MRI study was performed 30 days prior to surgery. The use of SPECT MPI in the Medicare population has substantially increased in recent years. Between 1998 and 2006, the rate of MPI use in the Medicare population increased 51 percent among cardiologists in the hospital setting, and by 215 percent in private offices.[18] Further analysis at the Mayo Clinic Rochester in May 2005 found that of all SPECT MPI procedures performed 14 percent were considered inappropriate and 11 percent were of uncertain appropriateness using the criteria published by the American College of Cardiology Foundation and the American Society of Nuclear Cardiology.[19] The use of SPECT MPI and stress MRI in the hospital outpatient setting represents a key area for resource use containment and potential cost control while improving the value and safety of care provided to patients.

The Steering Committee acknowledged that this measure targets a major problem area in the outpatient imaging arena where there are significantly high rates of inappropriate testing. The Committee further noted that the measure was highly feasible because it uses administrative data only. The initial measure submission is specified for use at hospital-based outpatient facilities only. The Steering Committee requested the measure developers consider other settings of care; the measure developer agreed to include all outpatient imaging, as a substantial percentage of imaging occurs outside of the hospital outpatient setting.

This project's Call for Measures resulted in the submission of two similar measures focused on cardiac imaging for non-cardiac low-low risk surgery patients from two different developers. The American College of Cardiology (ACC) submitted a similar measure (IEP-014-10 Cardiac stress imaging not meeting appropriate use criteria: Preoperative evaluation in low risk surgery patients). The Committee reviewed both measures and determined that while both have similar constructs there were some important distinctions. The Committee worked with both measure developers (CMS and the ACC) to align lists of "low-risk surgeries" specified in each measure. Aligning the lists of "low-risk surgeries" improves public reporting, interpretability, and dissemination of the measures and their results. Both measure developers were agreeable to

aligning their list of "low-risk surgeries." The Steering Committee recommended the measure for endorsement based on the importance of the measure in targeting a major problem area in the outpatient imaging arena.

IEP-013-10 Use of brain computed tomography (CT) in the Emergency Department (ED) for atraumatic headache (Centers for Medicare and Medicaid Services) *This measure calculates the percentage of Emergency Department visits for headache with a coincident brain computed tomography (CT) study for Medicare beneficiaries. The results are segmented and reported at the facility level.*

This facility level measure assesses the rate of ED visits for a headache with a concurrent brain CT study for Medicare beneficiaries. The results of the measure are intended to be segmented and reported at the facility level. Evidence suggests headaches account for approximately 16 million physician visits in the U.S. annually.[20] Between 1992 and 2001, headaches represented approximately two percent of all ED visits.[21] With the rate of CT studies in the ED increasing, there are major concerns regarding potential undue harm toward patients, lower quality of care, and system inefficiencies.[22, 24]

The Steering Committee determined that this measure is also appropriate for a younger population because it targets a high overuse area within that population and has the potential for great quality improvement; the Committee also acknowledged its importance in the Medicare population. The Committee noted that the measure was highly feasible because it relies on administrative data. In order to improve the implementation and public reporting of the measure, the Committee requested the measure developer specify in more detail the implementation instructions. The measure developer clarified the measure's implementation instructions and specifications and provided parameters to calculate the measure denominator exclusion codes and numerator specifications. The Steering Committee was agreeable to the revised implementation guidelines and recommended the measure for endorsement.

IEP-014-10 Cardiac stress imaging not meeting appropriate use criteria: preoperative evaluation in low risk surgery patients (American College of Cardiology) *Percentage of stress SPECT MPI and stress echo performed in low risk surgery patients for preoperative evaluation.*

This facility level measure assesses the rate of inappropriate stress SPECT MPI and stress echocardiograms performed in low risk surgery patients for preoperative evaluation. While cardiac imaging has become a primary decision making tool for patients with known or suspected heart disease, concerns have arisen regarding the substantial geographic variation in ordering patterns and the limited amount of evidence-based data supporting the use of imaging as it relates to patient outcomes.[25] Given the prevalence of cardiovascular disease and the subsequent rise in cardiac imaging expenditures, it is critical to determine the appropriate use of diagnostic tests, specifically stress SPECT MPI, in order to improve efficiencies and reduce potential undue harm towards patients. The measure attempts to resolve both the cost and quality issue surrounding inappropriate use of SPECT MPI and stress echocardiograms performed in low risk surgery patients as inappropriate care leads to both higher costs and poorer quality of care.

The Steering Committee determined that the measure targets a critical imaging area with significant opportunities to improve efficiency. Some members of the Committee noted that this measure addresses an imaging area with very high rates of inappropriate testing, which is of particular interest to purchasers. The Steering Committee had concerns about the reliability testing of the measure (i.e., whether the testing to date was sufficient), denominator exclusions, narrow scope, and the need to harmonize or align the measure with another submitted measure under review.

The Committee requested the measure developer expand the sampling period from 60 days (2 months) to one year (12 months) due to concerns about whether facilities would have large enough sample sizes for reporting. The ACC presented data from the SPECT MPI pilot indicating that a 60-day sampling period would be sufficient for facilities to generate the necessary sample size required to publicly report the measure. The ACC SPECT MPI pilot found:

> Six sites participated in this pilot study; 3 urban, 2 suburban, and 1 rural location. Practices were located in Florida, Wisconsin, Oregon, and Arizona, and the number of

cardiologists at each site ranged from 7 to 20 physicians. The number of SPECT MPI patients submitted from each site varied from 328 to 1,597 patients.

Based on this additional information, the Committee dropped the request to expand the sampling time frame.

The Committee requested the measure developers remove the specified denominator exclusion criteria: "patients without sufficient patient selection criteria recorded." The Committee was concerned that this exclusion would create a perverse incentive for individuals not to record criteria. The ACC agreed to remove the identified exclusion criteria.

The Committee requested expansion of the scope to include stress MRI and coronary computed tomography angiography (CTA). The ACC agreed to expand the measure scope.

This project's Call for Measures resulted in the submission of two similar measures focused on cardiac imaging for non-cardiac, low-low risk surgery patients from two different developers. The Centers for Medicare and Medicaid submitted a similar measure (IEP-010-10 Preoperative evaluation for low risk non-cardiac surgery risk assessment. The Committee reviewed both measures and determined that while both have similar constructs there were some important distinctions. The Committee worked with both measure developers (ACC and CMS) to align lists of "low-risk surgeries" specified in each measure. Aligning the lists of "low-risk surgeries" improves public reporting, interpretability, and dissemination of the measures and their results. Both measure developers were agreeable to aligning their list of "low-risk surgeries." The Steering Committee recommended the measure for endorsement.

IEP-015-10 Cardiac stress imaging not meeting appropriate use criteria: routine testing after percutaneous coronary intervention (PCI) (American College of Cardiology) *Percentage of all stress SPECT MPI and stress echo performed routinely after PCI, with reference to timing of test after PCI and symptom status.*

This facility level measure assesses the rate of all stress SPECT MPI and stress echocardiograms performed routinely after PCI with the aim to improve efficiencies and achieve cost control. With the increased use of cardiac imaging modalities in recent years, concerns have arisen regarding the substantial geographic variation in ordering patterns and the limited amount of

evidence-based data supporting the use of imaging as it relates to patient outcomes.[26] The measure focuses on the inappropriate use of SPECT MPI and stress echocardiograms post PCI.

The Steering Committee determined that the measure targets a critical imaging area with significant opportunities to improve efficiency in an expanding and changing field. The Committee requested the measure developer remove the denominator exclusion criteria, "patients without sufficient patient selection criteria recorded." The Committee was concerned that such an exclusion would create a perverse incentive for individuals to not record criteria to improve their measure performance. The ACC agreed to remove the identified exclusion criteria. The Committee requested the measure developers consider an expansion of the denominator population to include coronary artery bypass graft (CABG). The ACC responded that inclusion of CABG would not be appropriate for the denominator because: it has a different timeframe for follow-up testing, the procedure is generally performed in more complex patients, and testing may actually be appropriate in some patients. The Committee agreed with the ACC response.

The Committee challenged the narrow scope of the measure and requested the ACC expand the measure scope to include stress MRI and CTA. The ACC agreed to include stress MRI and CTA in the measure, but stated that the addition will capture only a small portion of imaging modalities for the target population. The Committee accepted these additions. The Steering Committee recommended the measure for endorsement.

IEP-016-10/ Cardiac stress imaging not meeting appropriate use criteria: testing in asymptomatic, low risk patients (American College of Cardiology) *Percentage of all stress SPECT MPI and stress echocardiograms performed in asymptomatic, low coronary heart disease (CHD) risk patients for initial detection and risk assessment.*

This facility level measure aims to assess the rate of stress SPECT PMI and stress echocardiograms performed in asymptomatic, low CHD risk patients for initial detection and risk assessment. While cardiac imaging has become a primary decision-making tool for patients with known or suspected heart disease, concerns have arisen regarding the substantial geographic variation in ordering patterns and the limited amount of evidence-based data supporting the use of imaging as it relates to patient outcomes.[27] Given the prevalence of cardiovascular disease and

the subsequent rise in cardiac imaging expenditures, it is critical to determine the appropriate use of diagnostic tests, specifically stress SPECT MPI in order to improve efficiencies and reduce potential undue harm towards patients. The measure attempts to resolve both the cost and quality issue surrounding inappropriate use of SPECT MPI and stress echocardiograms performed in asymptomatic, low CHD risk patients.

The Steering Committee stated concerns with the measure's denominator exclusion criteria, perceived lack of risk adjustment, and narrow scope. The Committee requested the measure developers remove the specified denominator exclusion criteria: "patients without sufficient patient selection criteria recorded." The Committee was concerned that this exclusion would create a perverse incentive for individuals not to record criteria. The ACC agreed to remove the identified exclusion criteria.

The Committee requested expanding the scope to include MRI and coronary computed tomography angiography (CTA). The ACC agreed to expand the measure scope.

The Committee requested that ACC explore the addition of a risk adjustment model. The ACC responded that the measure explicitly considers risk; specifically, the measure uses a risk calculator model to account for risk. This risk model takes into account two clinical characteristics of the patient—symptom status and global risk for CHD. The latter consists of numerous factors including age, gender, smoking status, blood pressure, lipid profile, etc. Exclusions for a known history of CHD, pre-op evaluation, and prior testing also are included to ensure that patients who are not being seen for initial evaluation of CHD are excluded. Additional risk adjustments are not required since patient risk is already core to the definition of this measure. The Committee accepted the developer's responses. The Steering Committee recommended the measure for endorsement.

Candidate Consensus Standards Awaiting Formal Recommendation

IEP-008-10 Appropriate **cervical spine** CT **imaging** in **trauma** (Brigham and Women's Hospital)
Percent of adult patients undergoing cervical spine CT scans for trauma who have a documented evidence-based indication prior to imaging (Canadian C-Spine Rule or the NEXUS Low-Risk Criteria).

This clinician, facility, or population level measure assesses whether adult patients who undergo cervical spine CT scans for trauma have documented evidence-based indications prior to imaging (Canadian C-Spine Rule or the NEXUS Low-Risk Criteria). In 2006, more than 13 million trauma patients at risk of cervical spine injury presented to emergency departments across the U.S.[28] Clinical decision rules (NEXUS and Canadian C-spine rule) were developed to identify patients at low risk for cervical spine injury and therefore safe to discharge without imaging of the cervical spine. These validated decision rules were meant to improve efficiency and decrease variation in radiography utilization, but remain underutilized.[29]

With the introduction of new technologies (CT)), clinical practice in the U.S. is shifting toward the use of plain CT rather than radiographys as the initial routine imaging modality in screening for cervical spine injury. This measure aims to ensure that if a CT scan is ordered as the initial imaging modality for patients at low risk of a cervical spine fracture that as a minimum standard, the same decision guidelines for radiography should be followed.

The Steering Committee agreed the measure targets an important imaging modality with significant potential for improvement in efficiencies. NQF has a currently endorsed cervical imaging measure related to the use of cervical spine radiographs, thus the Committee suggested that the measure developer work with Harborview Medical Center, the steward of a currently endorsed measure (NQF#0512 "Percentage of patients who do not have neck pain, distracting pain, neurological deficits, reduced level of consciousness, or intoxication") to include CT imaging of the cervical spine in the measure. The endorsed measure follows very similar constructs to the currently submitted measure (IEP-008-10), but focuses on radiographs rather than CT. At this time, both measure developers are working together to combine the two measures into one that would assess the use of cervical spine radiographs or cervical spine CT.

The amended measure will be brought back to the Steering Committee when available for review.

Candidate Consensus Standards **Not** Recommended for Endorsement

Mammography-Related Measures (American College of Radiology)

The American College of Radiology (ACR) submitted a series of mammography-related measures for consideration. The Committee had concerns that any one individual measure could provide a comprehensive view of mammography for public reporting. The Committee recommended that the measure developer consider options to "pair" or combine the measures or develop a composite measure that would include: Cancer detection rate (IEP-001-10), Diagnostic mammography positive predictive value 2 (PPV2—biopsy recommended) (IEP-003-10), and Abnormal interpretation rate of screening mammography exams (recall rate) (IEP-004-10). ACR proposed that the measures could be paired; however, the specifications included no guidance or instructions on how the measures would be paired or reported. The Steering Committee recognized that the mammography measures were not currently designed to be a composite measure, but believed there would be value in combining and presenting the measures as a package (e.g., all three should be used together). As part of this request, the Committee requested specification on how the measures were intended to be paired and reported. For example, how should the measures be reported if a facility could only report one or two of the measures, but not all? ACR later stated that at this time a composite is "premature to publicly report such data until sufficient evidence based guidance has been developed…." With no guidance on how to report the proposed paired measures the Steering Committee was unable to assess and review the measures as a combined measure. The Steering Committee supports ACR's efforts in the development of a combined or composite measure and also suggested that ACR consider age stratification and other risk adjustment models. Given concerns with the lack of guidance on how to present, measure, and publicly report a combined suite of mammography measures the Committee decided to not recommend the proposed combined three measures.

548

549 Discussion of the Individual ACR Mammography Measures

550 IEP-001-10 Cancer detection rate (American College of Radiology) *The percentage of screening*
551 *mammograms interpreted as positive (BIRADS 0, 4, or 5) that had a tissue diagnosis of cancer within 12*
552 *months.*
553

554 This facility level measure aims to evaluate the rate of screening mammograms interpreted as
555 positive (BIRADS 0, 4, or 5) that have a tissue diagnosis of cancer within 12 months. The
556 Steering Committee acknowledged the value of the measure, but expressed concern that the
557 measure in isolation is not informative for public reporting and quality improvement.
558 Furthermore, the Steering Committee acknowledged the measures may lack meaning or fail to
559 provide actionable information at the facility level. Facilities must have enough breast cancer
560 events to make the measures meaningful, which may pose a potential problem for facilities with
561 too few breast cancer events. Given concerns with the measure's lack of actionable information
562 at the facility level the Committee did not recommend the individual measure, Cancer detection
563 rate (IEP-001-10), for endorsement.

564 IEP-002-10 Screening mammography positive predictive value 2 (PPV2—biopsy recommended)
565 (American College of Radiology) *Percentage of screening mammograms with abnormal interpretation*
566 *(BIRADS 0, 4, or 5) that result in a tissue diagnosis of cancer within 12 months. The measure is to be*
567 *reported annually based on aggregated patient data for mammograms performed 12 to 24 months prior to*
568 *the reporting date to allow a 12 month follow-up.*
569

570 This facility level measure aims to evaluate the rate of breast cancer screening recommended for
571 biopsy. A higher rate of screenings recommended for biopsy could reflect inefficient care (e.g.,
572 undue harm or resource waste) while a low rate of screenings recommended for biopsy could
573 equate with missed cancers. The Steering Committee noted this measure addressed a very
574 important measurement area, but had challenges in it constructs. The first discrepancy pertaining
575 to the measure was in regards to the measure title, "positive predictive value 2." The Steering
576 Committee indicated the measure should read "positive predictive value 1" according to the
577 specification laid out by the measure developer. While the Steering Committee felt the measure
578 had value, it could not be used in isolation. Given concerns with the measure's lack of actionable

information at the facility level the Committee did not recommend the individual measure Screening mammography positive predictive value 2 (PPV2—biopsy recommended) (IEP-002-10) for endorsement.

IEP-003-10 Diagnostic Mammography positive predictive value 2 (PPV2—biopsy recommended) (American College of Radiology) *Percentage of diagnostic mammograms recommended for biopsy or surgical consult (BIRADS 4 or 5) that result in a tissue diagnosis of cancer within 12 months. The measure is to be reported annually based on aggregated patient data for mammograms performed 12 to 24 months prior to the reporting date to allow a 12 month follow up.*

This facility level measure aims to evaluate the rate of diagnostic mammograms recommended for biopsy or surgical consult (BIRADS 4 or 5) that result in a tissue diagnosis of cancer within 12 months. The Steering Committee noted this measure addressed a very important measurement area; however, concerns were raised regarding the feasibility of the measure as most centers do not have the necessary data. The Committee noted that performing this measure may add extra work to facilities implementing this measurement process. Despite potential limitations, the Committee noted the measure could serve as a standalone measure, though it would be better as a paired suite. Given concerns with the measure's lack of actionable information at the facility level the Committee did not recommend the individual measure Diagnostic mammography positive predictive value 2 (PPV2—biopsy recommended) (IEP-003-10) for endorsement.

IEP-004-10 Abnormal **interpretation rate** of **screening mammography exams** (**recall rate**) (American College of Radiology) *The percentage of screening mammograms interpreted as positive (BIRADS 0, 4, 5)***.**

This facility level measure aims to evaluate the rate of screening mammograms interpreted as positive (BIRADS 0, 4, or 5). While the Committee acknowledged the overall value of the measure, there were significant reservations noted. ACR provided no acceptable or average abnormal interpretation recall rate. With no range and rates varying from 2 percent to 27 percent it is difficult to distinguish quality. Furthermore, the Committee noted there were potentially large unintended consequences as a woman may not know which facility to choose based on the reported rate. The Committee identified additional areas for improvement related to stratification by both age and first and subsequent mammograms. Given concerns with the measure's lack of actionable information at the facility level the Committee did not recommend the individual

measure Abnormal interpretation rate of screening mammography exams (recall rate) (IEP-004-10) for endorsement.

IEP-009-10 Mammography **follow**-up **rates** (Centers for Medicare and Medicaid Services) *This measure calculates the percentage of Medicare patients with mammography screening studies done in the outpatient hospital setting that are followed within 45 days by a diagnostic mammography or ultrasound of the breast study in an outpatient or office setting.*

This clinician, facility, or population level measure aims to evaluate the rate of Medicare patients with mammography screening studies done in the outpatient hospital setting that are followed up within 45 days by a diagnostic mammography or ultrasound. The Committee acknowledges the measure addresses a critical topic area in the outpatient imaging realm, but had significant reservations about the measure specifications and usability. It was the consensus of the Committee that the measure assesses recall rates; however, the measure does not include a measure that assesses cancer detection rates. The major concern of the Committee is that a clinician or facility could perform well on this measure by having low recall rates while simultaneously having a substantial number of missed cancers, highlighting the importance of having both. Members of the Committee encouraged the measure developer to explore further development options that would measure performance for both mammography follow-up rates and cancer detection rates.

The measure developer was agreeable to expanding the scope of the measure and ran tests to validate the accuracy of added CPT codes. Overall the Committee was not concerned with the validity of the codes, but rather that the generation of the measure reflects recall rates alone. Given the concerns and potential unintended consequences the Committee did not recommend the measure for endorsement.

IEP-006-10 Appropriate head CT imaging in adults with acute atraumatic headache (Brigham and Women's Hospital) *Percent of adults undergoing head CT for acute atraumatic headache who have a documented indication consistent with clinical guidelines.*

This clinician, facility, or national level measure assess whether adults who undergo head CT scans for acute, atraumatic headaches have the necessary documented indication consistent with

clinical guidelines. Members of the Committee acknowledged the measure addresses a critical imaging topic area and was similar in focus to the CMS measure, Use of brain computed tomography in the emergency department for atraumatic headaches (IEP-013-10) submitted to the project. This measure uses different specifications than the CMS measure and is based on American College of Emergency Physicians Clinical Policy. The measure guidelines include both level B and level C recommendation with level C recommendations including "panel consensus" in addition to recommendations based on lower quality studies. While the Committee agreed that the availability of high-level evidence to support the efficient use of CT imaging in adults with acute atraumatic headache is lacking, they had concerns recommending a measure for endorsement based on the measures current level of evidence. The Committee did not recommend the measure for endorsement.

IEP-011-10 Use of stress echocardiography, SPECT MPI, and cardiac stress MRI post CABG (Centers for Medicare and Medicaid Services) *This measure identifies the post-CABG patients being treated with an outpatient service in an outpatient hospital facility, who also had an imaging procedure done at a hospital outpatient facility (i.e., post-CABG patients receiving imaging procedures without exclusion /post-CABG patients seen at the hospital outpatient facility).*

This facility level measure aims to evaluate the rate of post-CABG patients being treated with an outpatient service in an outpatient hospital facility, who also had an imaging procedure done at a hospital outpatient facility (i.e., post-CABG patients receiving imaging procedures without exclusion /post-CABG patients seen at the hospital outpatient facility). The Committee expressed significant concerns with the measure as submitted to NQF. The Committee's primary concerns were related to the measure's numerator exclusions, potential unintended consequences for small facilities, and narrow scope.

The Steering Committee laid out three specific conditions for endorsement recommendation: removal of a six-month blackout period, expansion of the measure sample size, and the broadening of the measure scope. First, the Committee requested the removal of the specified six-month exclusion criteria or blackout period where by, "patients with catheterization, percutaneous coronary intervention (PCI) or CABG procedures in six months following the imaging study" are removed from the numerator of the measure. The Committee determined that

there are no guidelines for the six-month exclusion criteria and it does not add value. The measure developer responded that the ACC's guidelines do not specify a blackout timeframe. Members from the CMS and Lewin Outpatient Imaging Efficiency Technical Expert Panel empirically examined different timeframes for a blackout period and concluded that three months was too short, and decided upon a six month blackout window.

In addition, the Committee requested the measure developer expand the measure sample size. While the measure developer acknowledged the Committee's concern and "believes that adjustment to increase sample size likely may be needed," they were unwilling to make the necessary changes. The measure developer cited that timeframe constraints limited their ability to make significant changes to the measure specifications.

The Committee requested the measure developer consider expanding the scope of the measure to include PCI and other settings of care. CMS was agreeable to expanding the scope of the measure to include free standing cardiac centers. Furthermore, the measure developers agreed to expand the measure to PCI, but would measure and report CABG and PCI separately.

While the measure developer agreed to several of the Committee conditions for recommendation, the Steering Committee's final determination was to not recommend the measure for NQF endorsement. The decision was based on the Committee's reservations pertaining to the measure's numerator exclusion criteria. The Committee encouraged the measure developer to reconsider the conditions for recommendation proposed by the Steering Committee and submit a revised measure to NQF at a later date.

IEP-017-10 Adequacy of data to assess appropriate use of cardiac stress imaging (American College of Cardiology)

This facility-level measure aims to evaluate the adequacy of data used to justify the ordering of cardiac stress imaging with the goal of reducing inappropriate stress imaging. Given the rate of cost growth in the cardiac imaging field the Committee noted this measure works to address a key area in the outpatient imaging realm important for both payers and consumers.

Despite the need for measures that reduce waste and cost growth in the cardiac imaging field, the

Steering Committee did not recommend this measure for NQF endorsement because it did not sufficiently meet NQF's measure importance criteria. Specifically, the submitted measure's specified numerator and denominator are identical, limiting or eliminating the meaningfulness of the measure. Furthermore, the measure is not a measure of *efficiency*; rather it is a measure that indicates if a patient's chart has the data indicating why a test was performed. The Committee noted further problems pertaining to the measure's data specifications and potential legal requirements. Given the Steering Committee's concerns with the measure, the Committee elected to not recommend the measure for NQF endorsement.

IEP-012-10 Simultaneous use of brain computed tomography (CT) and sinus computed tomography (Centers for Medicaid and Medicare) *This measure calculates the percentage of brain CT studies with a simultaneous sinus CT (i.e., brain and sinus CT studies performed on the same day at the same facility). Results of this measure are to be segmented and reported at the facility level.*

This facility level measure assesses the rate of patients who received both a brain CT study and, simultaneously, a sinus CT study (i.e., brain and sinus CT studies performed on the same day at the same facility). The intent of the measure is to lower the number of potentially unnecessary sinus CTs performed for patients evaluated for a headache who have already had a brain CT. The Steering Committee felt the measure addressed an important opportunity to change the clinical behavior with respect to ordering practices while lessening the potential undue harm to patients from radiation exposure.

The Steering Committee had concerns that a substantial number of facilities would not be able to report the measure because they would have sample sizes that were too small, thus limiting the number of facilities from across the nation that could report the measure. Further, the Committee determined that the measure does not meet the NQF Importance Criteria because it does not target an imaging practice with a substantial or large magnitude of overutilization. The measure developer stated that approximately five percent of patients who received a brain CT also received a sinus CT on the same day, thus reaffirming the Committee's view that this imaging practice does not have substantial overuse to support measurement endorsement. Given the Steering Committee's concerns with the measure, and because the measure did not meet NQF's Importance Criteria, the Committee did not recommend the measure for endorsement.

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NATIONAL VOLUNTARY CONSENSUS STANDARDS FOR IMAGING EFFICIENCY
APPENDIX A: MEASURE SPECIFICATIONS

Appendix A: Specifications of the National Voluntary Consensus Standards for Imaging Efficiency

The following table presents the detailed specifications for the Nation Quality Forum (NQF)-endorsed® *National Voluntary Consensus Standards for Imaging Efficiency*. All information presented has been derived directly from measure sources/developers without modification or alteration (except when the measure developed agreed to such modification during the NQF Consensus Development Process) and is current as of May 4, 2010. All NQF-endorsed voluntary consensus standards are open source, meaning they are fully accessible and disclosed. Measures were developed by the American College of Radiology, Brigham and Women's Hospital, Centers for Medicare and Medicaid Services and the American College of Cardiology.

Measure Numbers	Measure Title	Measure Steward	Measure Description	Numerator	Denominator	Exclusions	Data Source	Level of Analysis
Measure ID #: IEP-005-10	Appropriate Pulmonary CT Imaging for Pulmonary Embolism	Brigham and Women's Hospital	Percent of patients undergoing CT pulmonary angiogram for the evaluation of possible PE who have a documented indication consistent with guidelines (1) prior to CT imaging. (1) Torbicki A, Perrier A, Konstantinides S, et al. Guidelines on the diagnosis and management of acute pulmonary embolism: the Task Force for the Diagnosis and Management of Acute Pulmonary Embolism of the European Society of Cardiology (ESC). Eur Heart J. 2008 Sep;29(18):2276-315	Number of denominator patients with a documented indication consistent with guidelines prior to CT imaging.	Number of patients who have a CT pulmonary angiogram (CTPA) for the evaluation of possible pulmonary embolism.	Hemodynamically unstable pulmonary embolism suspected by hypotension and/or shock*	Lab data, Management data, Survey: Patient	Clinicians: Group, Facility/Agency, Population: national, Population: regional/network, Population: states, Program: QIO
Measure ID #: IEP-007-10	Appropriate Head CT Imaging in Adults with Mild Traumatic Brain Injury	Brigham and Women's Hospital	Percent of adult patients who presented within 24 hours of a non-penetrating head injury with a Glasgow coma score (GCS) >13 and underwent head CT for trauma in the ED who have a documented indication consistent with guidelines(1) prior to imaging. (1) Jagoda AS, Bazarian JJ, Bruns JJ Jr, Cantrill SV, Gean AD, Howard PK, Ghajar J, Riggio S, Wright DW, Wears RL, Bakshy A, Burgess P, Wald MM Whitson RR; American College of Emergency Physicians; Centers for Disease Control and Prevention. Clinical policy: neuroimaging and decision-making in adult mild traumatic brain injury in the acute setting. Ann Emerg Med.	Number of denominator patients who have a documented indication consistent with the ACEP clinical policy for mild traumatic brain injury prior to imaging.	Number of adult patients undergoing head CT for trauma who presented within 24 hours of a non-penetrating head injury with a Glasgow Coma Scale (GCS).	Age <16 years - GCS <14 on initial ED evaluation - Obvious penetrating skull injury or obvious depressed skull fracture - Patients with multisystem trauma - Returned for reassessment of the same injury - Pregnant	Lab data, Electronic administrative data/claims, Management data	Clinicians: Group, Facility/Agency, Population: national, Population: states, Population: regional/network

			2008 Dec;52(6):714-48. PubMed PMID: 19027497.					
Measure ID #: IEP-010-10	Preoperative Evaluation for Low-Risk Non-Cardiac Surgery Risk Assessment	Centers for Medicare and Medicaid Services	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.	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.	Number of low-risk, non-cardiac surgeries performed at the hospital outpatient facility.	N/A	Electronic administrative data/claims	Population: national, Clinicians: Other, Program: Other, Facility/Agency Hospital Outpatient Department Outpatient Imaging Efficiency (OIE)
Measure ID #: IEP-013-10	Use of Brain Computed Tomography (CT) in the Emergency Department (ED) for Atraumatic Headache	Centers for Medicare and Medicaid Services	This measure calculates the percentage of Emergency Department (ED) visits for headache with a coincident brain computed tomography (CT) study for Medicare beneficiaries. The results are segmented and reported at the facility level.	Of ED visits identified in the denominator, visits with a coincident Brain CT study (i.e. Brain CT studies on the same day for the same patient).	ED patient visits with a primary diagnosis code of headache.	Claims with secondary diagnosis codes related to: - lumbar puncture, - dizziness, paresthesia, - lack of coordination, - subarachnoid hemorrhage, - complicated or thunderclap headache - focal neurologic deficit - pregnancy - trauma - HIV	Electronic administrative data/claims	Clinicians: Other, Population: national, Program: Other, Facility/Agency Outpatient Hospital Outpatient Imaging Efficiency (OIE)
Measure ID #: IEP-014-10	Cardiac stress imaging not meeting appropriate use criteria: Preoperative evaluation in low risk surgery patients	American College of Cardiology	Percentage of stress SPECT MPI, stress echo, CCTA, or CMR performed in low risk surgery patients for preoperative evaluation	Number of stress SPECT MPI, stress echo, CCTA, or CMR performed in low risk surgery patients as a part of the preoperative evaluation	Number of stress SPECT MPI, stress echo, CCTA, and CMR performed	N/A	Paper medical record/flowsheet, Survey: Provider	Facility/Agency

Measure ID #: IEP-015-10	Cardiac stress imaging not meeting appropriate use criteria: Routine testing after percutaneous coronary intervention (PCI)	American College of Cardiology	Percentage of all stress SPECT MPI and stress echo performed routinely after PCI, with reference to timing of test after PCI and symptom status.	Number of stress SPECT MPI, stress echo, CCTA and CMR performed in asymptomatic patients within 2 years of the most recent PCI	Number of stress SPECT MPI, stress echo, CCTA and CMR performed	N/A	Lab data, special or unique data	Facility/Agency
Measure ID #: IEP-016-10	Cardiac stress imaging not meeting appropriate use criteria: Testing in asymptomatic, low risk patients	American College of Cardiology	Percentage of all stress SPECT MPI, stress echo, CCTA, and CMR performed in asymptomatic, low CHD risk patients for initial detection and risk assessment	Number of stress SPECT MPI, stress echo, CCTA, and CMR performed for asymptomatic, low CHD risk patients for initial detection and risk assessment*	Number of stress SPECT MPI, stress echo, CCTA, and CMR performed	N/A	Lab data, registry data	Facility/Agency

[1]Measure steward and copyright holder. ALL RIGHTS RESERVED. For the most current specifications and supporting information, please refer to the measure stewards:

Brigham and Women's Hospital (**http://www.brighamandwomens.org/)**
ACR- American College of Radiology (**http://www.acr.org/)**
CMS- Centers for Medicare and Medicaid (**http://www.cms.gov/**)
ACC- American College of Cardiology (**http://www.acc.org/**)

[2]Measure developer.

National Voluntary Consensus Standards for Patient Outcomes
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NATIONAL VOLUNTARY CONSENSUS STANDARDS FOR IMAGING EFFICIENCY
APPENDIX C: Other NQF-Endorsed Imaging Efficiency Consensus Standards

Measure	Measure Steward	Numerator	Denominator	Exclusions
Measure ID #: 0507 Stenosis measurement in carotid imaging studies	ACR/AMA PCPI/NCQA	Final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement. Definition: "Direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement" includes direct angiographic stenosis calculation based on the distal lumen as the denominator for stenosis measurement *OR* an equivalent validated method referenced to the above method (e.g., for duplex ultrasound studies, velocity parameters that correlate with anatomic measurements that use the distal internal carotid lumen as the denominator for stenosis.	All final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed.	N/A
Measure ID #: 0508 Inappropriate use of "probably benign" assessment category in mammography screening*	ACR/AMA PCPI/NCQA	Final reports classified as "probably benign." Definition of "probably benign" classification: MQSA assessment category of "probably benign"; BI-RADS® category 3; or FDA approved equivalent assessment category.* Instructions: For performance, a lower percentage, with a definitional target approaching 0%, indicates appropriate assessment of screening mammograms (e.g., the proportion of screening mammograms that are classified as "probably benign").	All final reports for screening mammograms.	N/A
Measure ID #: 0509 Reminder system for mammograms	ACR/AMA PCPI/NCQA	Patients whose information is entered into a reminder system* with a target due date for the next mammogram.	All patients aged 40 years and older undergoing a screening mammogram.	N/A

Measure ID #: 0510 Exposure time reported for procedures using fluoroscopy	ACR/AMA PCPI/NCQA	Final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time.	All final reports for procedures using fluoroscopy.	N/A
Measure ID #: 0511 Correlation with existing imaging studies for all patients undergoing bone scintigraphy	SNM/AMA PCPI/NCQA	Final reports that include physician documentation of correlation with existing relevant* imaging studies (e.g., x-ray, MRI, CT).	All final reports for patients, regardless of age, undergoing bone scintigraphy.	System reason for not documenting correlation with existing relevant imaging studies in final report (e.g., no existing relevant imaging study available,* patient did not have a previous relevant imaging study).
Measure ID #: 0512 Percentage of patients undergoing cervical spine radiographs in trauma who do not have neck pain, distracting pain, neurological deficits, reduced level of consciousness, or intoxication	Harborview Medical Center	Number of patients who receive cervical spine radiographs for trauma who either: 1. Do not fulfill the NEXUS Low-Risk Criteria for cervical spine injury: neck pain or posterior mid-line cervical spine tenderness, distracting pain, neurological deficits, reduced level of consciousness or intoxication, or 2. Do not fulfill the Canadian C-Spine Rule Criteria for cervical spine radiography (applies to stable trauma patients with a GCS of 15 and a potential C-Spine Injury).a. If there is a high-risk factor, radiography is necessitated (Age 65 or older, significant mechanism** or parathesias in the extremities). b. If there is a low risk factor which does not permit safe assessment of the range of motion then radiography should be performed. Low-risk factors permitting safe range of motion assessment include: i. Simple rear-end collision (excluding rollover, collision with bus, large truck, vehicle traveling at high speeds or being pushed into oncoming traffic), or ii. Patient found sitting in the Emergency Department or ambulatory after the incident or delayed onset of neck pain, or iii. Absence of any midline cervical	Number of cervical spine radiographs performed on trauma patients.	Patients who have not experienced trauma. Patients <16 years of age. Patients >65 years of age. Patients with reduced ability to communicate (permanent verbal or cognitive dysfunction).

		tenderness. c. Range of motion assessment: Is the patient able to actively rotate the neck 45 degrees to the left and right? If the patient is unable, radiography should be performed, otherwise radiography should not be performed. Numerous well-designed large prospective studies (specifically the NEXUS and Canadian cervical spine rule studies) have evaluated the efficacy of cervical spine radiography in trauma, and they have found that no patient has had a clinically significant cervical spine injury if they had no neck pain, no distracting pain, no neurological deficits, a normal level of consciousness, and no intoxication.		
Measure ID #: 0513 Use of contrast: Thorax CT	CMS	Thorax CT–Use of combined studies (with and without contrast). The number of thorax CT studies with and without contrast (combined studies). Sum of global and technical units associated with CPT codes: 71270–Thorax CT With and Without Contrast. A technical unit can be identified by a modifier code of TC. A global unit can be identified by the absence of a TC or 26 modifier code. Thorax CT studies can be billed separately for the technical and professional components, or billed globally to include both the professional and technical components. Professional component claims will outnumber Technical component claims due to over reads. To capture all outpatient and office volume, both office (typically paid under the MPFS) and facility claims (typically paid under the OPPS/ APC methodology) should be considered. In the absence of a TC or 26 modifier code, outpatient facility claims should be considered technical components and included in utilization.	Thorax CT–Use of combined studies (with and without contrast). The number of thorax CT studies performed (with contrast, without contrast or both with and without contrast). Sum of global and technical units for CPT codes: 71250–Thorax Without Contrast 71260–Thorax CT With Contrast 71270–Thorax CT With and Without Contrast.	N/A

Measure ID: 0514 MRI lumbar spine for low back pain	CMS	Number of Lumbar MRI studies where there are indications in the claim file of antecedent conservative therapy among patients with low back pain (excluding operative, tumor, and acute injury cases). Antecedent conservative therapy may include codes for manual therapy or massage, chiropractic care, or a prior exam for low back pain evaluation.	Number of Lumbar MRI studies for patients with low back pain (excluding operative, tumor, and acute injury cases).	Lumbar Spine MRI studies without an ICD-9 related to low back pain. Patients with Cancer: ICD-9-CM codes 140208, 230-234, 235-239. (Recent) Trauma: ICD-9- CM codes 800, 839, 850-854, 860-869, 905-909, 926.11, 926.12, 929, 952, 958- 959 (Recent) IV Drug Abuse: ICD-9-CM codes 304.0, 304.1X, 304.2X, 304.4X, 305.4X, 305.5X, 305.6X, 305.7X (Recent) Neurologic Impairment: ICD-9-CM codes 344.60, 729.2 Human Immunodeficiency Virus (HIV): ICD-9-CM codes 042-044; 279.3Unspecified Immune Deficiencies; Intraspinal abscess: ICD-9-CM codes 324.9, 324.1.
Measure ID: Carotid imaging reports	American None. Academy of Nursing, American College of Radiology, American Medical Association, National Committee for Quality Assurance	Final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement. ICD-9 diagnosis codes, CPT procedure codes, and patient demographics (age, gender, etc) are used to determine patients that are included in the measure. **y** ICD-9-CM codes: 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, 435.0, 435.1, 435.2, 435.3, 435.8, 435.9, 997.02 *AND* CPT codes with or without Modifier 26 to specify physician component: 70547, 70548, 70549, 70498, 75660, 75662, 7566, 75671, 75676, 75680, 93880, 93882.	All final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed for patients aged 18 years and older with a diagnosis of ischemic stroke or TIA.	N/A

Measure ID: Computed tomography (CT) or magnetic resonance imaging (MRI) reports	American None. College of Radiology, American Medical Association, National Committee for Quality Assurance, American Medical Association Physician Consortium for Performance Improvement American College of Nurse-Midwives	Final reports of the initial CT or MRI that include documentation of the presence or absence of each of the following: hemorrhage and mass lesion and acute infarction.	All final reports for CT or MRI studies of the brain performed within 24 hours of arrival to the hospital for patients aged 18 years and older with the admitting diagnosis of ischemic stroke or TIA or intracranial hemorrhage ICD-9 Diagnosis codes, CPT procedure codes, CPT Category II codes, and patient demographics (age, gender, etc.) are used to determine patients that are included in the measure. y ICD-9-CM codes: 431, 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, 435.0, 435.1, 435.2, 435.3, 435.8, 435.9, 997.02 *AND* CPT II 3111F: CT or MRI of the brain performed within 24 hours of arrival to the hospital; 3112F: CT or MRI of the brain performed greater than 24 hours of arrival to the hospital *AND* CPT codes with or without Modifier 26 to specify physician component: 70450, 70460, 70470, 70551, 70552, 70553, 0042T.	N/A
Measure ID: Low back pain (LBP): repeat imaging studies	National Committee for Quality Assurance	The number of patients with inappropriate imaging studies (as defined in denominator).	Patients with more than one imaging study and patients with only one imaging study and no documentation in medical record of physician asking about prior imaging.	Patients with red flags or worsening/progressive signs.
Measure ID: LBP: appropriate imaging for acute	National Committee for Quality	The number of patients with an order for or report on an imaging study during the six weeks after pain onset.	Patients with back pain lasting six weeks or less.	Patients with documentation of red flags.

back pain	Assurance			
Measure ID: LBP: use of imaging studies	National Committee for Quality Assurance	Patients who received an imaging study (plain x-ray, MRI, CT scan) conducted on the Episode Start Date or in the 28 days following the Episode Start Date.	All patients aged 18-50 years as of December 31 of the measurement year with a new episode of low back pain.	Exclude patients with an indication for imaging studies in the presence of low back pain. Cancer: ICD-9-CM codes: 140-208, 230-239 (Recent) Trauma: ICD-9-CM codes: 800-839, 850-854, 860-869, 905-909, 926.11, 926.12, 929, 952, 958-959 (Recent) IV drug abuse: ICD-9-CM codes: 304.0, 304.1x, 304.2x, 304.4x, 305.4x, 305.5x, 305.6x, 305.7x (Recent) Neurologic impairment: ICD-9-CM codes: 344.60, 729.2.

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