

American College of Radiology/  
Physician Consortium for Performance Improvement® (PCPI)/  
National Committee for Quality Assurance

**Radiology**  
***Physician Performance Measurement Set***

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Physician Performance Measures (Measures) and related data specifications have been developed by the American Medical Association (AMA) in collaboration with the Physician Consortium for Performance Improvement (the Consortium) and the National Committee for Quality Assurance (NCQA).

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**Purpose of Measures:**

These clinical performance measures, developed by the American College of Radiology, the Physician Consortium for Performance Improvement® (Consortium), and the National Committee for Quality Assurance, are designed for individual quality improvement. Unless otherwise indicated, the measures are also appropriate for accountability if appropriate methodological, statistical, and implementation rules are achieved.

**Accountability Measures:**

Measure #1: Stenosis measurement in carotid imaging reports

Measure #2: Mammography assessment category data collection

Measure #3: Inappropriate use of "probably benign" assessment category in mammography screening

Measure #4: Communication of suspicious findings from the diagnostic mammogram to the practice managing ongoing care

Measure #5: Communication of suspicious findings from the diagnostic mammogram to the patient

Measure #6: Reminder system for mammograms

Measure #7: CT radiation dose reduction

Measure #8: Exposure time reported for procedures using fluoroscopy

**Intended Audience and Patient Population:**

These measures are designed for use by physicians and for calculating reporting or performance measurement at the individual physician level. When existing hospital-level or plan-level measures are available for the same measurement topics, the Consortium attempts to harmonize the measures to the extent feasible.

These measures are designed for radiologists and other physicians directing or performing the selected imaging examinations (ie, carotid imaging studies, screening and diagnostic mammograms, CT examinations, procedures which use fluoroscopy).

The Consortium also encourages the use of these measures by eligible health professionals, where appropriate.

**Measure Specifications**

The Consortium seeks to specify measures for implementation using multiple data sources, including paper medical record, administrative (claims) data, and particular emphasis on Electronic Health Record Systems (EHRS). Specifications to report on these measures for Radiology using administrative (claims) data are included in this document. We have identified codes for these measures, including ICD-9 and CPT (Evaluation & Management Codes, Category I and where Category II codes would apply). Specifications for additional data sources, including EHRS, will be fully developed at a later date.

**Measure Exclusions:**

For process measures, the Consortium provides three categories of reasons for which a patient may be excluded from the denominator of an individual measure:

- **Medical reasons**

Includes:

- not indicated (absence of organ/limb, already received/performed, other)
- contraindicated (patient allergic history, potential adverse drug interaction, other)

- **Patient reasons**

Includes:

- patient declined
- economic, social, or religious reasons
- other patient reasons

- **System reasons**

Includes:

- resources to perform the services not available
- insurance coverage/payor-related limitations
- other reasons attributable to health care delivery system

These measure exclusion categories are not available uniformly across all measures; for each measure, there must be a clear rationale to permit an exclusion for a medical, patient, or system reason. The exclusion of a patient may be reported by appending the appropriate modifier to the CPT Category II code designated for the measure:

- **Medical reasons:** modifier 1P
- **Patient reasons:** modifier 2P
- **System reasons:** modifier 3P

Although this methodology does not require the external reporting of more detailed exclusion data, the Consortium recommends that physicians document the *specific* reasons for exclusion in patients' medical records for purposes of optimal patient management and audit-readiness. The Consortium also advocates the systematic review and analysis of each physician's exclusions data to identify practice patterns and opportunities for quality improvement. For example, it is possible for implementers to calculate the percentage of patients that physicians have identified as meeting the criteria for exclusion.

Please refer to documentation for each individual measure for information on the acceptable exclusion categories and the codes and modifiers to be used for reporting.

Measures #1-8 in the Radiology measurement set are process measures.

For **outcome measures**, the Consortium specifically identifies all acceptable reasons for which a patient may be excluded from the denominator. Each specified reason is reportable with a CPT Category II code designated for that purpose.

There are no outcome measures in the Radiology measurement set.

The Consortium continues to evaluate and likely will evolve its methodology for handling exclusions as it gains experience in the use of the measures. The Consortium welcomes comments on its exclusions methodology.

### **Data Capture and Measure Calculation**

The Consortium intends for physicians to collect data on each patient eligible for a measure. Feedback on measures should be available to physicians by patient to facilitate patient management and in aggregate to identify opportunities for improvement across a physician's patient population.

Measure calculations will differ depending on whether a rate is being calculated for performance or reporting purposes.

The method of calculation for performance follows these steps: first, identify the patients (or reports) who meet the eligibility criteria for the denominator (PD); second, identify which of those patients (or reports) meet the numerator criteria (A); and third, for those patients (or reports) who do not meet the numerator criteria, determine whether an appropriate exclusion applies and subtract those patients from the denominator (C). (See examples below)

*Note: For several measures in the Radiology measurement set, the unit of measurement is the "final report."*

The methodology also enables implementers to calculate the rates of exclusions and to further analyze both low and high rates, as appropriate (see examples below).

The method of calculation for reporting differs. One program which currently focuses on reporting rates is the Centers for Medicare and Medicaid Services (CMS) Physician Quality Reporting Initiative (PQRI). Currently, under that program design, there will be a reporting denominator determined solely from claims data (CPT and ICD-9), which in some cases result in a reporting denominator that is much larger than the eligible population for the performance denominator. Additional components of the reporting denominator are explained below.

The components that make up the numerator for reporting include all patients/reports from the eligible population for which the physician has reported, including: the number of patients/reports who meet the numerator criteria (A), the number of patients/reports for whom valid exclusions apply (C) and also the number of patients/reports who do not meet the numerator criteria (D). These components, where applicable, are summed together to make up the inclusive reporting numerator. The calculation for reporting will be the reporting numerator divided by the reporting denominator. (see examples below).

Examples of calculations for reporting and performance are provided for each measure.

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions.

**Numerator (A) Includes:**

Number of patients/reports meeting numerator criteria

**Performance Denominator (PD) Includes:**

Number of patients/reports meeting criteria for denominator inclusion

**Denominator Exclusions (C) Include:**

Number of patients/reports with valid medical, patient or system exclusions (where applicable; will differ by measure)

**Performance Calculation**

$$\frac{\text{A (\# of patients meeting numerator criteria)}}{\text{PD (\# patients in denominator) - C (\# patients with valid denominator exclusions)}}$$

It is also possible to calculate the percentage of patients excluded overall, or excluded by medical, patient, or system reason where applicable:

**Overall Exclusion Calculation**

$$\frac{\text{C (\# of patients with any valid exclusion)}}{\text{PD (\# patients in denominator)}}$$

OR

**Exclusion Calculation by Type**

$$\frac{\text{C}_1 (\# \text{ patients with medical reason})}{\text{PD (\# patients in denominator)}}$$

$$\frac{\text{C}_2 (\# \text{ patients with patient reason})}{\text{PD (\# patients in denominator)}}$$

$$\frac{\text{C}_3 (\# \text{ patients with system reason})}{\text{PD (\# patients in denominator)}}$$

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following components, where applicable. (There may be instances where there are no patients to include in A, C, D, or E).**

**A.** Number of patients/reports meeting additional denominator criteria (for measures where true denominator cannot be determined through ICD-9 and CPT Category I coding alone) AND numerator criteria

**C.** Number of patients/reports with valid medical, patient or system exclusions (where applicable; will differ by measure)

**D.** Number of patients/reports not meeting numerator criteria and without a valid exclusion

**E.** All other patients/reports not meeting additional denominator criteria (for measures where true denominator cannot be determined through ICD-9 and CPT Category I coding alone)

**Reporting Denominator (RD) Includes:**

**RD.** Denominator criteria (identifiable through ICD-9 and CPT Category I coding)

**Reporting Calculation**

**A**(# of patients meeting additional denominator criteria AND numerator criteria) + **C**(# of patients with valid exclusions) + **D**(# of patients NOT meeting numerator criteria) + **E**(# of patients not meeting additional denominator criteria)

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**RD** (# of patients in denominator)

## Radiology

### Measure #1: Stenosis measurement in carotid imaging reports

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement</p> <p><i>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 (eg, for duplex ultrasound studies, velocity parameters that <u>correlate</u> with anatomic measurements that use the distal internal carotid lumen as the denominator for stenosis measurement)</i></p> <p><b>Denominator:</b> All final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed</p> <p><b>Denominator Exclusions:</b> None</p> <p><b>Measure:</b> Percentage of final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement</p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>...the NASCET method of calculating stenosis measurement should be employed when angiography is used to correlate US findings. (Grant et al., SRU, 2003)<sup>1</sup></p> <p>For patients with symptomatic atherosclerotic carotid stenosis &gt;70%, as defined using the NASCET criteria, the value of carotid endarterectomy (CEA) has been clearly established from the results of 3 major prospective randomized trials: the NASCET, the European Carotid Surgery Trial (ECST), and the Veterans Affairs Cooperative Study Program. Among symptomatic patients with TIAs or minor strokes and high-grade carotid stenosis, each trial showed impressive relative and absolute risk reductions for those randomized to surgery. For patients with carotid stenosis &lt;50%, these trials showed that there was no significant benefit of surgery. (Sacco et al., ASA, 2006)<sup>2</sup></p> <p>It is important to consider that the degree of carotid stenosis in ECST was measured differently than that in NASCET. The degree of carotid stenosis is significantly higher if calculated by the NASCET rather than the ECST method. In summary, it appears that patients with a recent TIA or nondisabling stroke with ipsilateral carotid stenosis benefit from surgery if the stenosis is &gt;50% as measured by the NASCET method; however, this benefit appears to be less pronounced in women. Recently symptomatic patients with &gt;70% stenosis as measured by the NASCET method can expect a far greater benefit from carotid endarterectomy. (Albers et al., AHA, 1999)<sup>3</sup></p>
<p><b>Rationale for the measure:</b> Since the clinical decision-making is based on randomized trial evidence and degree of stenosis is an important element of the decision for carotid intervention, characterization of the degree of stenosis needs to be standardized. Requiring that stenosis calculation be based on a denominator of distal internal carotid diameter or, in the case of duplex ultrasound, velocity measurements that have been correlated to angiographic stenosis calculation based on distal internal carotid diameter, makes</p>

the measure applicable to both imaging and duplex studies.

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions.

**Performance Numerator (A) Includes:**

- Final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement

**Performance Denominator (PD) Includes:**

- All final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed

**Performance Calculation**

$$\frac{\text{A (\# of final reports meeting measure criteria)}}{\text{PD (\# of final reports in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement
<b>PD</b>	# of final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following instances:**

**A.** Final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement

**D.** Final carotid imaging study reports that do not include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement

**Reporting Denominator (RD) Includes:**

- All final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed

**Reporting Calculation**

$$\frac{\text{A(\# of final reports meeting numerator criteria) + D(\# of final reports NOT meeting numerator criteria)}}{\text{RD (\# of final reports in denominator)}}$$

Components for this measure are defined as:

<b>A</b>	# final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement
<b>D</b>	# final carotid imaging study reports that <u>do not</u> include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement
<b>RD</b>	# of final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed

**Measure Specifications – Measure #1:** Stenosis measurement in carotid imaging reports

Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

Denominator (Eligible Population): All final reports for carotid imaging studies (neck MR angiography [MRA], neck CT angiography [CTA], neck duplex ultrasound, carotid angiogram) performed

**CPT® Procedure Code:**

- 70498
- 70547, 70548, 70549
- 75660, 75662, 75665, 75671, 75676, 75680
- 93880, 93882

Numerator: Final carotid imaging study reports that include direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement

- **CPT Category II code:** 3100F- Carotid image study report includes direct or indirect reference to measurements of distal internal carotid diameter as the denominator for stenosis measurement

Denominator Exclusion: *None*

**B. Electronic Health Record System (in development)**

**C. Paper Medical Record (in development)**

## Radiology

### Measure #2: Mammography assessment category data collection

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate</p> <p><i>Definition of abnormal interpretation (recall): Any screening mammograms that receive an MQSA assessment category of incomplete, probably benign, suspicious or highly suggestive of malignancy; BI-RADS® category 0, 3, 4, or 5; or FDA-approved equivalent assessment categories</i></p> <p><b>Denominator:</b> All patients undergoing screening mammograms</p> <p><b>Denominator exclusions:</b> None</p> <p><b>Measure:</b> Percentage of patients undergoing screening mammograms whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate</p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>Certain minimum raw data should be collected and utilized to calculate important derived data that allow each radiologist to assess his or her overall performance in mammography interpretation. (ACR, 2003)<sup>4</sup></p> <p>The Basic Clinical Relevant Mammography Audit: The Core [Derived] Data to be Collected and Calculated [from Raw Data includes]: Abnormal interpretation (recall) rate for screening cases. (ACR, 2003)<sup>4</sup></p> <p>Each facility shall establish and maintain a mammography medical outcomes audit program to follow up positive mammographic assessments and to correlate pathology results with the interpreting physician's findings. This program shall be designed to ensure reliability, clarity, and accuracy for the interpretation of mammograms. Analysis of these outcome data shall be made individually and collectively for all interpreting physicians at a facility at least annually. (ACR, 2004)<sup>5</sup></p> <p>Accurate record keeping, patient tracking, and outcome analysis are important for effective, diagnostic mammographic imaging evaluations. (ACR, 2003)<sup>6</sup></p>
<p><b>Rationale for the measure:</b> Recent studies have shown that while radiologists surpass recommendations for most mammography services, the recall rate for almost half of radiologists is higher than recommended.<sup>7</sup> Collecting the data elements required to allow for internal calculation of recall rate is a first step in encouraging quality improvement activities.</p>

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions.

**Performance Numerator (A) Includes:**

- Patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories\*] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate

**Performance Denominator (PD) Includes:**

- All patients undergoing screening mammograms

**Performance Calculation**

$$\frac{\text{A (\# of patients meeting measure criteria)}}{\text{PD (\# of patients in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories*] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate
<b>PD</b>	# of patients undergoing screening mammograms

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following instances:**

**A.** Patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories\*] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate

**D.** Patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories\*] is not entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate

**Reporting Denominator (RD) Includes:**

- All patients undergoing screening mammograms

\*See table at the end of document for a list of equivalent categories

### Reporting Calculation

$$\frac{A(\text{\# of patients meeting numerator criteria}) + D(\text{\# of patients NOT meeting numerator criteria})}{RD (\text{\# of patients in denominator})}$$

Components for this measure are defined as:

<b>A</b>	# of patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories*] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate
<b>D</b>	# of patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories*] is <u>not</u> entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate
<b>RD</b>	# of patients undergoing screening mammograms

**Measure Specifications** – *Measure #2: Mammography assessment category data collection*  
Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

**Denominator (Eligible Population):** All patients undergoing screening mammograms

**ICD-9 Diagnosis Code:**

- V76.11, V76.12

**AND**

**CPT® Procedure Code or HCPCS G-Code:** (with or without modifier 52)

- 77057
- G0202

**Numerator:** Patients whose assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories\*] is entered into an internal database that will, at a minimum, allow analysis of abnormal interpretation (recall) rate

**CPT Category II code :** 7020F- Mammogram assessment category [eg, Mammography Quality Standards Act (MQSA), Breast Imaging Reporting and Data System (BI-RADS®), or FDA approved equivalent categories] entered into an internal database to allow for analysis of abnormal interpretation (recall) rate

**Denominator Exclusion:** *None*

**B. Electronic Health Record System** (*in development*)

**C. Paper Medical Record** (*in development*)

## Radiology

### Measure #3: Inappropriate use of “probably benign” assessment category in mammography screening

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Final reports classified as “probably benign”</p> <p><i>Definition of “probably benign” classification: MQSA assessment category of “probably benign”; BI-RADS® category 3; or FDA-approved equivalent assessment category*</i></p> <p><b>Denominator:</b> All final reports for screening mammograms</p> <p><b>Denominator Exclusion:</b> None</p> <p><b>Measure:</b> Percentage of final reports for screening mammograms that are classified as “probably benign”</p> <p><i>Instructions: For performance, a lower percentage, with a definitional target approaching 0%, indicates appropriate assessment of screening mammograms (eg, the proportion of screening mammograms that are classified as “probably benign”).</i></p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>Do not use Category 3 in interpreting screening examinations. (ACR, 2003)<sup>4</sup></p> <p>All the published studies emphasize the need to conduct a complete diagnostic imaging evaluation before making a probably benign (Category 3) assessment; hence it is inadvisable to render such an assessment when interpreting a screening examination. (ACR, 2003)<sup>4</sup></p> <p>The use of Category 3, probably benign, is reserved for findings that are almost certainly benign. It must be emphasized that this is NOT an indeterminate category for malignancy, but one that, for mammography, has a less than 2% chance of malignancy (i.e. is almost certainly benign). (ACR, 2003)<sup>4</sup></p> <p>Such findings are generally identified on baseline screening or on screening for which previous examinations are unavailable for comparison. Immediate evaluation with additional mammographic views and/or ultrasound is required to render a Category 3, probably benign assessment. (ACR, 2003)<sup>4</sup></p>
<p><b>Rationale for the measure:</b></p> <p>Although a mammogram assessment category of “probably benign” is not recommended for use in interpreting screening mammograms, it is associated with up to 11% of screening mammograms and accounts for over 40%–50% of abnormal screening mammograms.<sup>8</sup> A mammogram assessment category of “probably benign” is coupled with a recommendation for short-interval follow-up (typically 6 months), resulting in economic and emotional consequences for the women that receive them.</p>

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions. *Note: For performance, a lower percentage, with a definitional target of 0%, indicates appropriate assessment of screening mammograms (eg, the proportion of screening mammograms that are classified as "probably benign").*

**Performance Numerator (A) Includes:**

- 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\**

**Performance Denominator (PD) Includes:**

- All final reports for screening mammograms

**Performance Calculation**

$$\frac{\text{A (\# of final reports meeting measure criteria)}}{\text{PD (\# of final reports in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of final reports classified as "probably benign"
<b>PD</b>	# of final reports for screening mammograms

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following instances:**

- A. Final reports classified as "probably benign"
- D. Final reports not 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\**

**Reporting Denominator (RD) Includes:**

- All final reports for screening mammograms

\*See table at the end of document for a list of equivalent categories

### Reporting Calculation

$$\frac{A(\text{\# of final reports meeting numerator criteria}) + D(\text{\# of final reports NOT meeting numerator criteria})}{RD(\text{\# of final reports in denominator})}$$

Components for this measure are defined as:

<b>A</b>	# of final reports classified as "probably benign"
<b>D</b>	# of final reports <u>not</u> classified as "probably benign"
<b>RD</b>	# of final reports for screening mammograms

**Measure Specifications** – *Measure #3*: Inappropriate use of “probably benign” assessment category in mammography screening  
Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

**Denominator (Eligible Population):** All final reports for screening mammograms

**ICD-9 Diagnosis Codes:**

- V76.11, V76.12

**AND**

**CPT® Procedure Code or HCPCS G-Code:** (with or without modifier 52)

- 77057
- G0202

**Numerator:** 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\**

**CPT Category II code:** 3343F-Mammogram assessment category of “probably benign”, documented

**Denominator Exclusion:** None

**B. Electronic Health Record System** *(in development)*

**C. Paper Medical Record** *(in development)*

## Radiology

### Measure #4: Communication of suspicious findings from the diagnostic mammogram to the practice managing ongoing care

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Patients with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient's on-going care within 3 business days of exam interpretation</p> <p><i>Direct communication is defined as communication by the diagnostic imager or a designee to the treating or referring physician or his/her representative with confirmed receipt of the findings (either by fax confirmation, verbal communication, or certified letter)</i></p> <p><b>Denominator:</b> All patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy"</p> <p><i>Definition of "suspicious" or "highly suggestive of malignancy" classification: MQSA final assessment category of "suspicious" or "highly suggestive of malignancy"; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories*</i></p> <p><b>Denominator Exclusion:</b> Documentation of system reason(s) for not directly communicating the findings from the diagnostic mammogram to the practice that manages the patient's on-going care within 3 business days of exam interpretation (eg, patient is self-referred, no healthcare provider named)</p> <p><b>Measure:</b> Percentage of patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy" with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient's on-going care within 3 business days of exam interpretation</p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>When the patient has a referring healthcare provider or has named a healthcare provider, the facility shall:</p> <ul style="list-style-type: none"><li>• Provide a written report of the mammography examination, including the name of the patient and an additional patient identifier, to that healthcare provider as soon as possible, but no later than 30 days from the date of the mammography examination; and</li><li>• Make reasonable attempts to communicate directly with the healthcare provider as soon as possible, if the assessment is "suspicious" or "highly suggestive of malignancy." If the healthcare provider is unavailable, a report should be given to the responsible designee of the healthcare provider. The actual or attempted direct communication should be documented. (ACR, 2003)<sup>6</sup></li></ul> <p>It is important...that nonroutine communications be handled in a manner most likely to reach the attention of the treating or referring physician in time to provide the most benefit to the patient. Communication by telephone or in person to the treating or referring physician or his/her representative is appropriate and confirms receipt of the findings. This may be accomplished directly by the diagnostic imager or when judged appropriate (by the imager) a designee. (ACR, 2005)<sup>9</sup></p> <p>In order to meet the requirements for providing lay summaries and mammography reports, facilities can... Demonstrate that the facility is notifying patients and health care providers of positive examinations as soon as possible (as guidance, within 5 and 3 business days respectively). In the case of verbal communication, this may be done by documenting such communication in the mammography report or in logs. (FDA, 2007)<sup>10</sup></p>

**Rationale for the measure:**

As evidenced by malpractice claims research, failure to appropriately communicate findings is a common complaint against radiologists. A 2002 survey analyzing breast cancer malpractice claims found that 28% of them resulted from a delay in diagnosis stemming from some type of communication breakdown. Of those claims, “no direct contact was made for urgent or significant unexpected findings 71% of the time and there was a failure to document attempts to communicate 90% of the time.”<sup>11</sup> In order to prevent delays in patient care, this measure calls for direct communication within 3 business days - beyond that required by the Mammography Quality Standards Act.

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator and Denominator.

**Performance Numerator (A) Includes:**

- Patients with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation

**Performance Denominator (PD) Includes:**

- All patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy”

*Definition of “suspicious” or “highly suggestive of malignancy” classification: MQSA final assessment category of “suspicious” or “highly suggestive of malignancy”; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories\**

**Denominator Exclusions (C) Include:**

- Documentation of system reason(s) (eg, patient is self-referred, no healthcare provider named) for not directly communicating the findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation

**Performance Calculation**

$$\frac{A \text{ (# of patients meeting numerator criteria)}}{PD \text{ (# of patients in denominator) - C \text{ (# of patients with valid denominator exclusions)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of patients with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation
<b>PD</b>	# of patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy”
<b>C</b>	# of patients with documented system reason(s) for not directly communicating the findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator.

**Reporting Numerator includes each of the following instances:**

\*See table at the end of document for a list of equivalent categories

- A. Patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation
- C. Patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with no documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation, but for whom there is a documented system reason for not doing so
- D. Patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with no documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient’s on-going care within 3 business days of exam interpretation and there is no documented system reason for not doing so
- E. Patients undergoing diagnostic mammograms that are classified as “incomplete: need additional imaging evaluation”, “negative”, “benign”, “probably benign”, OR “known biopsy proven malignancy”

**Reporting Denominator (RD) Includes:**

- All patients undergoing diagnostic mammograms

*Definition of “suspicious” or “highly suggestive of malignancy” classification: MQSA final assessment category of “suspicious” or “highly suggestive of malignancy”; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories\**

**Reporting Calculation**

$$\frac{
 \begin{aligned}
 &A(\text{\# of patients meeting additional denominator criteria AND meeting numerator criteria}) + \\
 &C(\text{\# of patients meeting additional denominator criteria AND with valid exclusions}) + \\
 &D(\text{\# of patients meeting additional denominator criteria NOT meeting numerator criteria}) + \\
 &E(\text{\# of patients not meeting additional denominator criteria})
 \end{aligned}
 }{
 \text{RD}(\text{\# of patients in denominator})
 }$$

**Components for this measure are defined as:**

<b>A</b>	# of patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with documentation of direct communication of findings from the diagnostic mammogram to the practice who manages the patient’s on-going care within 3 business days of exam interpretation
<b>C</b>	# of patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with no documentation of direct communication of findings from the diagnostic mammogram to the practice who manages the patient’s on-going care within 3 business days of exam interpretation, but for whom there is a documented system reason for not doing so
<b>D</b>	# of patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with <u>no</u> documentation of direct communication of findings from the diagnostic mammogram to the practice who manages the patient’s on-going care within 3 business days of exam interpretation and there is no documented system reason for not doing so
<b>E</b>	# of patients undergoing diagnostic mammograms that are classified as “incomplete: need additional imaging evaluation”, “negative”, “benign”, “probably benign”, OR “known biopsy proven malignancy”
<b>RD</b>	# of patients undergoing diagnostic mammograms

\*See table at the end of document for a list of equivalent categories

Measure Specifications – Measure #4: Communication of suspicious findings from the diagnostic mammogram to the practice managing ongoing care  
Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

Denominator (Eligible Population): All patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy"

*Definition of "suspicious" or "highly suggestive of malignancy" classification: MQSA final assessment category of "suspicious" or "highly suggestive of malignancy"; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories\**

**CPT® Procedure Code or HCPCS G-Code:**

- 77055, 77056
- G0204, G0206

**AND**

- **CPT Category II code:** 3344F- Mammogram assessment category of "suspicious", documented  
**OR**  
**CPT Category II code:** 3345F-Mammogram assessment category of " highly suggestive of malignancy", documented

Numerator: Patients with documentation of direct communication of findings from the diagnostic mammogram to the practice that manages the patient's on-going care within 3 business days of exam interpretation

- **CPT Category II code:** 5060F-Findings from diagnostic mammogram communicated to practice managing patient's ongoing care within 3 business days of exam interpretation

Denominator Exclusion: Documentation of system reason(s) for not directly communicating the findings from the diagnostic mammogram to the practice that manages the patient's on-going care within 3 business days of exam interpretation

- **Append modifier to CPT Category II code:** 5060F -3P

**B. Electronic Health Record System** *(in development)*

**C. Paper Medical Record** *(in development)*

## Radiology

### Measure #5: Communication of suspicious findings from the diagnostic mammogram to the patient

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Patients with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation</p> <p><i>Direct communication is defined as communication by the diagnostic imager or a designee to the patient with confirmed receipt of the findings (either by fax confirmation, verbal communication, or certified letter).</i></p> <p><b>Denominator:</b> All patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy"</p> <p><i>Definition of "suspicious" or "highly suggestive of malignancy" classification: MQSA final assessment category of "suspicious" or "highly suggestive of malignancy"; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories*</i></p> <p><b>Denominator Exclusion:</b> None</p> <p><b>Measure:</b> Percentage of patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy" with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation</p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>The facility shall send or give directly to all patients a written summary, in lay terms, of the results of the study no later than 30 days from the date of the mammographic examination. If assessments are "suspicious" or "highly suggestive of malignancy" the facility shall make reasonable attempts to ensure that the results are communicated to the patient as soon as possible. (ACR, 2003)<sup>6</sup></p> <p>For self-referred patients (patients who do not name a healthcare provider) the facility must send or directly give the patient the actual mammographic report and a summary in lay terms no later than 30 days from the date of the mammographic examination. Facilities must also have a system to refer such patients to a healthcare provider when clinically indicated. Reports in the categories of "needs additional imaging evaluation," "probably benign, short-interval follow-up," "suspicious abnormality," or "highly suggestive of malignancy" should be communicated as soon as possible to the self-referred patient. (ACR, 2003)<sup>6</sup></p> <p>In order to meet the requirements for providing lay summaries and mammography reports, facilities can... Demonstrate that the facility is notifying patients and health care providers of positive examinations as soon as possible (as guidance, within 5 and 3 business days respectively). In the case of verbal communication, this may be done by documenting such communication in the mammography report or in logs. (FDA, 2007)<sup>10</sup></p>
<p><b>Rationale for the measure:</b></p> <p>As evidenced by malpractice claims research, failure to appropriately communicate findings is a common complaint against radiologists. A 2002 survey analyzing breast cancer malpractice claims found that 28% of them resulted from a delay in diagnosis stemming from some type of communication breakdown. Of those claims, "no direct contact was made for urgent or significant unexpected findings 71% of the time and there was a failure to document attempts to communicate 90% of the</p>

time.”<sup>11</sup> In order to prevent delays in patient care, this measure calls for direct communication within 5 business days - beyond that required by the Mammography Quality Standards Act.

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions.

*Instructions: The measure can also be satisfied if the physician has made reasonable attempts to communicate to the patient but is unable to confirm receipt. Reasonable attempts to communicate are defined as two phone calls and one written communication with return receipt requested.*

**Performance Numerator (A) Includes:**

- Patients with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation

**Performance Denominator (PD) Includes:**

- All patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy”

*Definition of “suspicious” or “highly suggestive of malignancy” classification: MQSA final assessment category of “suspicious” or “highly suggestive of malignancy”; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories\**

**Performance Calculation**

$$\frac{\text{A (\# of patients meeting measure criteria)}}{\text{PD (\# of patients in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of patients with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation
<b>PD</b>	# of patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy”

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator.

**Reporting Numerator includes each of the following instances:**

**A.** Patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation

**D.** Patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy” with no documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation

**E.** Patients undergoing diagnostic mammograms that are classified as “incomplete: need additional imaging evaluation”,

\*See table at the end of document for a list of equivalent categories

"negative", "benign", "probably benign", OR "known biopsy proven malignancy"

**Reporting Denominator (RD) Includes:**

- All patients undergoing diagnostic mammograms

**Reporting Calculation**

$$\frac{A(\text{\# of patients meeting additional denominator criteria AND meeting numerator criteria}) + D(\text{\# of patients meeting additional denominator criteria NOT meeting numerator criteria}) + E(\text{\# of patients not meeting additional denominator criteria})}{RD(\text{\# of patients in denominator})}$$

**Components for this measure are defined as:**

<b>A</b>	# of patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy" with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation
<b>D</b>	# of patients undergoing diagnostic mammograms that are classified as "suspicious" or "highly suggestive of malignancy" with <u>no</u> documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation
<b>E</b>	# of patients undergoing diagnostic mammograms that are classified as "incomplete: need additional imaging evaluation", "negative", "benign", "probably benign", OR "known biopsy proven malignancy"
<b>RD</b>	# of patients undergoing diagnostic mammograms

\*See table at the end of document for a list of equivalent categories

**Measure Specifications – Measure #5:** Communication of suspicious findings from the diagnostic mammogram to the patient

Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper).

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

Denominator (Eligible Population): All patients undergoing diagnostic mammograms that are classified as “suspicious” or “highly suggestive of malignancy”

*Definition of “suspicious” or “highly suggestive of malignancy” classification: MQSA final assessment category of “suspicious” or “highly suggestive of malignancy”; BI-RADS® category 4 or 5; or FDA-approved equivalent assessment categories\**

**CPT® Procedure Code or HCPCS G-Code:**

- 77055, 77056
- G0204, G0206

**AND**

- **CPT Category II code:** 3344F- Mammogram assessment category of “suspicious”, documented  
**OR**  
**CPT Category II code:** 3345F-Mammogram assessment category of “ highly suggestive of malignancy”, documented

Numerator: Patients with documentation of direct communication of findings from the diagnostic mammogram to the patient within 5 business days of exam interpretation patient

- **CPT Category II code:** 5062F-Findings from diagnostic mammogram communicated to patient within 5 business days of exam interpretation

Denominator Exclusion: *None*

**D. Electronic Health Record System (in development)**

**E. Paper Medical Record (in development)**

## Radiology

### Measure #6: Reminder system for mammograms

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Patients whose information is entered into a reminder system* with a target due date for the next mammogram</p> <p><i>*The reminder system should be linked to a process for notifying patients when their next mammogram is due and should include the following elements at a minimum: patient identifier, patient contact information, dates(s) of prior screening mammogram(s) (if known), and the target due date for the next mammogram</i></p> <p><b>Denominator</b> All patients aged 40 years and older undergoing a screening mammogram</p> <p><b>Denominator Exclusions:</b> None</p> <p><b>Measure:</b> Percentage of patients aged 40 years and older undergoing a screening mammogram whose information is entered into a reminder system* with a target due date for the next mammogram</p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>The U.S. Preventive Services Task Force (USPSTF) recommends screening mammography, with or without clinical breast examination (CBE), every 1-2 years for women aged 40 and older. (B Recommendation) (USPSTF, 2002)<sup>12</sup></p> <p>Asymptomatic women 40 years of age or older should have an annual screening mammogram. (ACR, 2003)<sup>5</sup></p> <p>The Task Force [on Community Preventive Services] recommends client reminders to increase breast cancer screening on the basis of <b>strong evidence</b> of effectiveness. (TFCPS, 2005)<sup>13</sup></p>
<p><b>Rationale for the measure:</b></p> <p>Although screening mammograms can reduce breast cancer mortality by 20-35% in women aged 40 years and older, recent evidence has suggested a decreasing trend in screening rates and a need for intervention.<sup>14</sup> Moreover, many American women do not receive mammograms at recommended intervals, as illustrated by a multiyear study of mammography utilization in a large screening center at Massachusetts General Hospital. The study found that more than half of women who received a mammogram in 1992 had fewer than five mammograms during the subsequent 10 years (the expected number if following a 2-year screening interval), and that only 6 percent received annual mammograms during the entire 10 years.<sup>15</sup> The use of patient reminders is associated with an increase in screening mammography and is currently recommended based on the results of a systematic review of studies conducted by the Task Force on Community Preventive Services.<sup>16</sup> Encouraging the implementation of a reminder system could therefore help to reverse the trend and lead to an increase in mammography.</p>

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions.

**Performance Numerator (A) Includes:**

- Patients whose information is entered into a reminder system\* with a target due date for the next mammogram

**Performance Denominator (PD) Includes:**

- All patients aged 40 years and older undergoing a screening mammogram

**Performance Calculation**

$$\frac{\text{A (\# of patients meeting measure criteria)}}{\text{PD (\# of patients in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of patients whose information is entered into a reminder system* with a target due date for the next mammogram
<b>PD</b>	# of patients aged 40 years and older undergoing a screening mammogram

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following instances:**

- A. Patients whose information is entered into a reminder system\* with a target due date for the next mammogram
- D. Patients whose information is not entered into a reminder system\* with a target due date for the next mammogram

**Reporting Denominator (RD) Includes:**

- All patients aged 40 years and older undergoing screening mammograms

**Reporting Calculation**

$$\frac{\text{A(\# of patients meeting numerator criteria) + D(\# of patients NOT meeting numerator criteria)}}{\text{RD (\# of patients in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of patients whose information is entered into a reminder system* with a target due date for the next mammogram
<b>D</b>	# of patients whose information is <u>not</u> entered into a reminder system* with a target due date for the next

	mammogram
<b>RD</b>	# of patients aged 40 years and older undergoing a screening mammogram

**Measure Specifications – Measure #6:** Reminder system for mammograms

Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

**Denominator (Eligible Population):** All patients aged 40 years and older undergoing a screening mammogram

**ICD-9 Diagnosis Code:**

- V76.11, V76.12

**AND**

**CPT® Procedure Code or HCPCS G-Code:** (with or without modifier 52)

- 77057
- G0202

**Numerator:** Patients whose information is entered into a reminder system\* with a target due date for the next mammogram

- **CPT Category II code:** 7025F-Patient information entered into a reminder system with a target due date for the next mammogram

**Denominator Exclusion:** None

**B. Electronic Health Record System** *(in development)*

**C. Paper Medical Record** *(in development)*

Radiology

Measure #7: CT radiation dose reduction

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Final reports for CT examinations that include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure</p> <p><b>Denominator:</b> All final reports for CT examinations performed</p> <p><b>Denominator Exclusion:</b> None</p> <p><b>Measure:</b> Percentage of final reports for CT examinations performed with documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure</p> <p><i>Instructions: Physician will need to document that radiation dose reduction device (ie, automated exposure control) was turned on for each scan or that the ALARA protocol was followed for manual techniques (ie, patient-size-specific scan parameters), while maintaining the necessary diagnostic image quality.</i></p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>Radiologists, radiologic technologists, and all supervising physicians have a responsibility to minimize radiation dose to individual patients, to staff, and to society as a whole, while maintaining the necessary diagnostic image quality. This is the concept "As Low As Reasonably Achievable (ALARA)." (ACR, 2006)<sup>17</sup></p> <p>Facilities, in consultation with the medical physicist, should have in place and should adhere to policies and procedures, in accordance with ALARA, to vary examination protocols to take into account patient body habitus, such as height and/or weight, body mass index or lateral width. (ACR, 2006)<sup>17</sup></p> <p>The dose reduction devices that are available on imaging equipment should be active or manual techniques should be used to moderate the exposure while maintaining the necessary diagnostic image quality. (ACR, 2006)<sup>17</sup></p>
<p><b>Rationale for the measure:</b></p> <p>While the use of CT in adults and children has increased nearly 7-fold in the past 10 years, data suggests that the lifetime risk for cancer can be increased, albeit by a small amount, with frequent or repeated exposure to ionizing radiation.<sup>18</sup> The BEIR (Biological Effects of Ionizing Radiation) report concluded that "the linear no-threshold model (LNT) provided the most reasonable description of the relation between low-dose exposure to ionizing radiation and the incidence of solid cancers that are induced by ionizing radiation."<sup>19</sup> Although dose reduction techniques, such as automated exposure controls, have been shown to reduce radiation dose by 20-40%, broad use of procedures or protocols is not in place to tailor CT examinations to the patient for dose reduction.<sup>20</sup> As children are more sensitive to radiation and have a longer anticipated lifespan over which time cancerous changes may occur, the ALARA concept is of particular concern in this population. The National Cancer Institute has noted "adjustments are not frequently made in the exposure parameters that determine the amount of radiation children receive from CT, resulting in a greater radiation dose than necessary."<sup>18</sup></p>

**Data capture and calculations:**

**Calculation for Performance**

For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator, Denominator, and Denominator Exclusions.

**Performance Numerator (A) Includes:**

- Final reports for CT examinations that include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure

**Performance Denominator (PD) Includes:**

- All final reports for CT examinations performed

**Performance Calculation**

$$\frac{\text{A (\# of final reports meeting measure criteria)}}{\text{PD (\# of final reports in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of final reports for CT examinations that include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure
<b>PD</b>	# of final reports for CT examinations performed

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following instances:**

**A.** Final reports for CT examinations that include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure

**D.** Final reports for CT examinations that do not include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure

**Reporting Denominator (RD) Includes:**

- All final reports for CT examinations performed

**Reporting Calculation**

$$\frac{\text{A(\# of final reports meeting numerator criteria) + D(\# of final reports NOT meeting numerator criteria)}}{\text{RD (\# of final reports in denominator)}}$$

**Components for this measure are defined as:**

<b>A</b>	# of final reports for CT examinations that include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure
<b>D</b>	# of final reports for CT examinations that <u>do not</u> include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure
<b>RD</b>	# of final reports for CT examinations performed

**Measure Specifications – Measure #7: CT radiation dose reduction**

Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

**Denominator (Eligible Population):** All final reports for CT examinations performed

**CPT® Procedure Code:**

- 0042T
- 0066T, 0067T
- 0144T, 0145T, 0146T, 0147T, 0148T, 0149T, 0150T, 0151T
- 20982
- 70450, 70460, 70470
- 70480, 70481, 70482
- 70486, 70487, 70488
- 70490, 70491, 70492
- 70496
- 70498
- 71250, 71260, 71270
- 71275
- 72125, 72126, 72127, 72128, 72129, 72130, 72131, 72132, 72133
- 72191, 72192, 72193, 72194
- 72292
- 73200, 73201, 73202
- 73206
- 73700, 73701, 73702
- 73706
- 74150, 74160, 74170
- 74175
- 75635
- 76380
- 76497
- 77011, 77012, 77013
- 77078, 77079
- 78814, 78815, 78816

**Numerator:** Final reports for CT examinations that include documentation of use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure

**CPT Category II code:** 6040F-Use of appropriate radiation dose reduction devices OR manual techniques for appropriate moderation of exposure, documented

**Denominator Exclusion:** None

**B. Electronic Health Record System (in development)**

**C. Paper Medical Record (in development)**

## Radiology

### Measure #8: Exposure time reported for procedures using fluoroscopy

This measure may be used as an Accountability measure

Clinical Performance Measure
<p><b>Numerator:</b> Final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time</p> <p><b>Denominator:</b> All final reports for procedures using fluoroscopy</p> <p><b>Denominator exclusions:</b> None</p> <p><b>Measure:</b> Percentage of final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time</p>
<p><b>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</b></p> <p>Radiation dose related information provided by automated dosimetry systems should be recorded in the patient's permanent record for procedures involving more than 10 minutes of fluoroscopic exposure. If automated dosimetry data is not available, fluoroscopic exposure times should be recorded in the patient's medical record for such procedures. (ACR, 2003)<sup>21</sup></p> <p>[ACR] should now encourage practices to record actual fluoroscopy time for all fluoroscopic procedures. The fluoroscopy time for various procedures (eg, upper gastrointestinal, pediatric voiding cystourethrography, diagnostic angiography) should then be compared with benchmark figures...More complete patient radiation dose data should be recorded for all high-dose interventional procedures, such as embolizations, transjugular intrahepatic portosystemic shunts, and arterial angioplasty or stent placement anywhere in the abdomen and pelvis. (Amis et al., ACR, 2007)<sup>22</sup></p> <p>Measure &amp; record patient radiation dose:</p> <ul style="list-style-type: none"><li>• Record fluoroscopy time</li><li>• Record available measures - DAP (dose area product), cumulative dose, skin dose (NCI, 2005)<sup>23</sup></li></ul>
<p><b>Rationale for the measure:</b></p> <p>Data suggests that the lifetime risk for cancer can be increased, albeit by a small amount, with frequent or repeated exposure to ionizing radiation, including procedures using fluoroscopy.<sup>18</sup> The BEIR report concluded that "the linear no-threshold model (LNT) provided the most reasonable description of the relation between low-dose exposure to ionizing radiation and the incidence of solid cancers that are induced by ionizing radiation."<sup>19</sup> In order to monitor these long term effects, the exposure time or radiation dose that a patient receives as a result of the procedure should be measured and recorded in the patient's record.</p>
<p><b>Data capture and calculations:</b></p> <p><b><u>Calculation for Performance</u></b> For performance purposes, this measure is calculated by creating a fraction with the following components: Numerator and Denominator.</p> <p><b>Performance Numerator (A) Includes:</b></p> <ul style="list-style-type: none"><li>• Final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time</li></ul> <p><b>Performance Denominator (PD) Includes:</b></p>

- All final reports for procedures using fluoroscopy

**Performance Calculation**

$\frac{A \text{ (# of final reports meeting numerator criteria)}}{PD \text{ (# of final reports in denominator)}}$
--------------------------------------------------------------------------------------------------------------------

Components for this measure are defined as:

<b>A</b>	# of final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time
<b>PD</b>	# of final reports for procedures using fluoroscopy

**Calculation for Reporting**

For reporting purposes, this measure is calculated by creating a fraction with the following components: Reporting Numerator and Reporting Denominator

**Reporting Numerator includes each of the following instances:**

- A. Final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time
- D. Final reports for procedures using fluoroscopy that do not include documentation of radiation exposure or exposure time

**Reporting Denominator (RD) Includes:**

- All final reports for procedures using fluoroscopy

**Reporting Calculation**

$\frac{A(\text{\# of final reports meeting numerator criteria}) + D(\text{\# of final reports NOT meeting numerator criteria})}{RD \text{ (\# of final reports in denominator)}}$
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Components for this measure are defined as:

<b>A</b>	# of final reports for procedures using fluoroscopy that include documentation of radiation exposure or exposure time
<b>D</b>	# of final reports for procedures using fluoroscopy that <u>do not</u> include documentation of radiation exposure or exposure time
<b>RD</b>	# of final reports for procedures using fluoroscopy

**Measure Specifications** – *Measure #8*: Exposure time reported for procedures using fluoroscopy  
Measure specifications for data sources other than administrative claims will be developed at a later date.

**A. Administrative claims data**

Administrative claims data collection requires users to identify the eligible population (denominator) and numerator using codes recorded on claims or billing forms (electronic or paper). Users report a rate based on all patients in a given practice for whom data are available and who meet the eligible population/denominator criteria.

The specifications listed below are those needed for performance calculation. Additional CPT II codes may be required depending on how measures are implemented. (Reporting vs. Performance)

Denominator (Eligible Population): All final reports for procedures using fluoroscopy

**CPT® Procedure Code:**

- 0062T
- 0075T
- 0080T
- 24516
- 25606
- 25651
- 26608
- 26650
- 26676
- 26706
- 26727
- 27235
- 27244, 27245
- 27506
- 27509
- 27756
- 27759
- 28406
- 28436
- 28456
- 28476
- 36597, 36598
- 37182, 37183, 37184, 37187, 37188, 37210
- 43260
- 43261, 43262, 43263, 43264, 43265, 43267, 43268, 43269, 43271, 43272
- 43752
- 44500
- 49440, 49441, 49442, 49446, 49450, 49451, 49452, 49460, 49465
- 50382, 50384, 50385, 50386, 50387, 50389
- 50590
- 61623
- 62263, 62264
- 62280, 62281, 62282
- 62318, 62319
- 63610
- 64510
- 64520
- 64530
- 64561
- 64605
- 64610
- 64620

- 64622
- 64626
- 64680, 64681
- 70010
- 70015
- 70170
- 70332
- 70370
- 70371
- 70373
- 70390
- 71023, 71034
- 71040, 71060
- 71090
- 72240, 72255, 72265, 72270
- 72275
- 72285
- 72291
- 72295
- 73040, 73085, 73115, 73525, 73542, 73580, 73615
- 74190
- 74210
- 74220
- 74230
- 74235
- 74240, 74241, 74245, 74246, 74247, 74249
- 74250, 74251
- 74260
- 74270, 74280
- 74283
- 74290, 74291
- 74300, 74305, 74320
- 74327, 74328, 74329, 74330
- 74340
- 74355
- 74360
- 74363
- 74400, 74410, 74415, 74420, 74425
- 74430
- 74440
- 74445
- 74450, 74455
- 74470
- 74475
- 74480
- 74485
- 74740
- 74742
- 75600, 75605, 75625, 75630
- 75650, 75658, 75660, 75662, 75665, 75671, 75676, 75680, 75685, 75705, 75710, 75716, 75722, 75724, 75726, 75731, 75733, 75736, 75741, 75743, 75746, 75756, 75790
- 75801, 75803, 75805, 75807
- 75809, 75810
- 75820, 75822, 75825, 75827, 75831, 75833, 75840, 75842, 75860, 75870, 75872, 75880
- 75885, 75887
- 75889, 75891

- 75893
- 75894, 75896
- 75898
- 75900, 75901, 75902
- 75940
- 75952, 75953, 75954
- 75956, 75957, 75958, 75959, 75960, 75961, 75962, 75966
- 75970
- 75978
- 75980
- 75982
- 75984
- 75992, 75994, 75995
- 76000, 76001
- 76080
- 76100, 76101, 76102
- 76120
- 76150
- 76496
- 77001, 77002, 77003
- 77031
- 77053, 77054
- 77071
- 92611
- 93555, 93556
- G0106
- G0120
- G0122
- G0259, G0260
- G0275
- G0278
- G0365

Numerator: Final reports for procedures which use fluoroscopy that include documentation of radiation exposure or exposure time

- **CPT Category II code:** 6045F-Radiation exposure or exposure time in final report for procedure using fluoroscopy, documented

Denominator Exclusion: *None*

**B. Electronic Health Record System** *(in development)*

**C. Paper Medical Record** *(in development)*

## EVIDENCE CLASSIFICATIONS / RATING SCHEMES

Screening for breast cancer: recommendations and rationale - U.S. Preventive Services Task Force Rating System<sup>12</sup>:

### **Strength of Recommendations**

The U.S. Preventive Services Task Force (USPSTF) grades its recommendations according to one of five classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms).

**A.**— The USPSTF strongly recommends that clinicians provide [the service] to eligible patients. *The USPSTF found good evidence that [the service] improves important health outcomes and concludes that benefits substantially outweigh harms.*

**B.**— The USPSTF recommends that clinicians provide [this service] to eligible patients. *The USPSTF found at least fair evidence that [the service] improves important health outcomes and concludes that benefits outweigh harms.*

**C.**— The USPSTF makes no recommendation for or against routine provision of [the service]. *The USPSTF found at least fair evidence that [the service] can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.*

**D.**— The USPSTF recommends against routinely providing [the service] to asymptomatic patients. *The USPSTF found at least fair evidence that [the service] is ineffective or that harms outweigh benefits.*

**I.**— The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing [the service]. *Evidence that the [service] is effective is lacking, of poor quality, or conflicting and the balance of benefits and harms cannot be determined.*

### **Quality of Evidence**

The USPSTF grades the quality of the overall evidence for a service on a 3-point scale (good, fair, poor):

**Good:** Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.

**Fair:** Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.

**Poor:** Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

<i>MQSA Assessment Category</i>	<i>Applicable BI-RADS® category</i>	<i>Other FDA-approved assessment descriptions</i>
<i>Incomplete</i>	<i>0</i>	Incomplete: Needs Additional Imaging Evaluation Incomplete: Additional Imaging Evaluation Needed Incomplete: Need Additional Imaging Evaluation - Comparison with Prior Studies Incomplete: Need Additional Imaging Evaluation and/or Prior Mammograms for Comparison Incomplete: Need Prior Mammograms for Comparison Need Additional Imaging Evaluation ( <i>the term "Incomplete" can be inferred in this example as this is the only Incomplete BI-RADS® assessment category</i> ) Incomplete Mammogram: Need Additional Imaging Evaluation
<i>Negative</i>	<i>1</i>	Negative Mammogram
<i>Benign</i>	<i>2</i>	Benign Finding Benign Findings Benign Abnormality Benign Abnormalities Benign Mammogram
<i>Probably Benign</i>	<i>3</i>	Probably Benign Finding Probably Benign Findings Probably Benign Abnormality Probably Benign Abnormalities Probably Benign - Short Interval Follow-up Suggested Probably Benign Finding - Short Interval Follow-up Suggested Probably Benign Mammogram
<i>Suspicious</i>	<i>4</i>	Suspicious Finding Suspicious Findings Suspicious Abnormality Suspicious Abnormalities Suspicious for Malignancy Suspicious of Malignancy Suspicious Abnormality - Biopsy Should Be Considered Suspicious Finding - Biopsy Should Be Considered Suspicious Mammogram
<i>Highly Suggestive of Malignancy</i>	<i>5</i>	Highly Suggestive for Malignancy Highly Suggestive of Malignancy - Appropriate Action Should Be Taken
<i>Known Biopsy Proven Malignancy</i>	<i>6</i>	Known Biopsy Proven Cancer Known Malignancy Known Cancer

## References

- <sup>1</sup> Grant EG, Benson CB, Moneta GL et al. Carotid artery stenosis: Gray-scale and doppler US diagnosis – Society of radiologists in ultrasound consensus conference. *Radiology*. 2003; 229:340-346.
- <sup>2</sup> Sacco RL, Adams R, Albers G, Alberts MJ, et al. Guidelines for Prevention of Stroke in Patients with Ischemic Stroke or Transient Ischemic Attack: A statement for healthcare professionals from the American Heart Association/American Stroke Association Council on Stroke. *Stroke* 2006;37:577-617.
- <sup>3</sup> Albers GW, Hart RG, Lutsep HL, Newell DW, Sacco RL. Supplement to the Guidelines for the Management of Transient Ischemic Attacks: A statement from the ad hoc committee on guidelines for the management of transient ischemic attacks, Stroke Council, American Heart Association (AHA). *Stroke* 1999; 30; 2501-2511.
- <sup>4</sup> American College of Radiology (ACR) Breast Imaging Reporting and Data System Atlas (BI-RADS® Atlas). Reston, Va: © American College of Radiology; 2003. All rights reserved.
- <sup>5</sup> American College of Radiology. ACR practice guideline for the performance of screening mammography. Reston, VA: American College of Radiology, 2004. Available at: [www.acr.org/SecondaryMainMenuCategories/quality\\_safety/guidelines.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines.aspx)
- <sup>6</sup> American College of Radiology. ACR practice guideline for the performance of diagnostic mammography. Reston, VA: American College of Radiology, 2003. Available at: [www.acr.org/SecondaryMainMenuCategories/quality\\_safety/guidelines.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines.aspx)
- <sup>7</sup> Rosenberg RD, Yankaskas BC, Abraham LA et al. Performance benchmarks for screening mammography. *Radiology*. 2006;241:55-66.
- <sup>8</sup> Yasmeeen S, Romano PS, Pettinger M, et al. Frequency and predictive value of a mammographic recommendation for short-interval follow-up. *Journal of the National Cancer Institute*. 2003;95(6):429-436.
- <sup>9</sup> American College of Radiology. ACR practice guideline for communication of diagnostic imaging findings. Reston, VA: American College of Radiology, 2005. Available at: [www.acr.org/SecondaryMainMenuCategories/quality\\_safety/guidelines.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines.aspx)
- <sup>10</sup> Department of Health and Human Services, Food and Drug Administration (FDA). *Mammography Quality Standards Act Regulations*. Policy Guidance Help System. Available at: <http://www.fda.gov/cdrh/mammography/robohelp/start.htm>.
- <sup>11</sup> Kushner DC, Lucey LL. Diagnostic radiology reporting and communication: the ACR guideline. *J Am Coll Radiol* 2005; 2:15 -21.
- <sup>12</sup> U.S. Preventive Services Task Force. Screening for breast cancer: recommendations and rationale. *Ann Intern Med* 2002 Sep 3;137(5 Part 1):344-6.
- <sup>13</sup> Task Force on Community Preventative Services. 2005. Promoting Breast and Cervical Cancer Screening in Communities: Task Force Recommendations on the Use of Client Reminders. Available at: [http://www.thecommunityguide.org/cancer/screening/CA\\_1-pager\\_clientremind\\_bc.pdf](http://www.thecommunityguide.org/cancer/screening/CA_1-pager_clientremind_bc.pdf).
- <sup>14</sup> Centers for Disease Control and Prevention. Use of Mammograms Among Women Aged >40 Years —United States, 2000–2005. *MMWR* 2007;56:49-68.
- <sup>15</sup> Blanchard K, Colbert JA, Puri D, et al. Mammographic screening: patterns of use and estimated impact on breast carcinoma survival. *Cancer* 2004;101(3):495-507.
- <sup>16</sup> Nass S, Ball J, eds. *Improving Breast Imaging Quality Standards*. Washington, DC: The National Academies Press; 2005.
- <sup>17</sup> American College of Radiology. ACR practice guideline for performing and interpreting diagnostic computed tomography (CT). Reston, VA: American College of Radiology, 2006. Available at: [www.acr.org/SecondaryMainMenuCategories/quality\\_safety/guidelines.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines.aspx)

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<sup>18</sup> National Cancer Institute (NCI), The Society for Pediatric Radiology (SPR). Brochure: Radiation & pediatric computed tomography. A guide for health care providers. 2002. Available at: <http://www.cancer.gov/cancertopics/causes/radiation-risks-pediatric-CT.pdf>.

<sup>19</sup> Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, National Research Council. *Health Risks From Exposure to Low Levels of Ionizing Radiation BEIR VII-Phase 2*. Washington, DC: National Academies Press; 2006.

<sup>20</sup> Frush DP. Review of radiation issues for computed tomography. *Semin Ultrasound CT MR*. 2004 Feb;25(1):17-24.

<sup>21</sup> American College of Radiology. ACR technical standard for management of the use of radiation in fluoroscopic procedures. Reston, VA: American College of Radiology, 2003. Available at: [www.acr.org/SecondaryMainMenuCategories/quality\\_safety/guidelines.aspx](http://www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines.aspx)

<sup>22</sup> Amis E Jr, Butler P, Applegate K, Birnbaum S, Brateman L, Hevezi J, Mettler F, Morin R, Pentecost M, Smith G. American College of Radiology white paper on radiation dose in medicine. *Journal of the American College of Radiology*. 2007;4:272-284.

<sup>23</sup> National Cancer Institute (NCI). Interventional fluoroscopy: Reducing radiation risks for patients and staff. 2005. Available at: <http://www.cancer.gov/cancertopics/interventionalfluoroscopy>.