ACR–ACNM–SNMMI–SPR PRACTICE PARAMETER FOR THE PERFORMANCE OF SCINTIGRAPHY AND UPTAKE MEASUREMENTS FOR BENIGN AND MALIGNANT THYROID DISEASE

PREAMBLE

This document is an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care[1]. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner considering all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by variables such as the condition of the patient, limitations of available resources, or advances in knowledge or technology after publication of this document. However, a practitioner who employs an approach substantially different from the guidance in this document may consider documenting in the patient record information sufficient to explain the approach taken.

The practice of medicine involves the science, and the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The purpose of this document is to assist practitioners in achieving this objective.

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1 *Iowa Medical Society and Iowa Society of Anesthesiologists v. Iowa Board of Nursing, 831 N.W.2d 826 (Iowa 2013) Iowa Supreme Court refuses to find that the "ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures (Revised 2008)" sets a national standard for who may perform fluoroscopic procedures in light of the standard's stated purpose that ACR standards are educational tools and not intended to establish a legal standard of care. See also, Stanley v. McCarver, 63 P.3d 1076 (Ariz. App. 2003) where in a concurring opinion the Court stated that "published standards or guidelines of specialty medical organizations are useful in determining the duty owed or the standard of care applicable in a given situation" even though ACR standards themselves do*

not establish the standard of care.

I. INTRODUCTION

This practice parameter was revised collaboratively by the American College of Radiology (ACR), the American College of Nuclear Medicine (ACNM), the Society of Nuclear Medicine and Molecular Imaging (SNMMI), and the Society for Pediatric Radiology (SPR).

This practice parameter is intended to guide interpreting physicians performing and interpreting thyroid scintigraphy, thyroid radioiodine uptake (RAIU) measurements, and whole-body radioiodine scintigraphy. Properly performed imaging and uptake examinations provide critical information on a variety of conditions that relate to the thyroid gland. Although results can suggest specific medical conditions or diseases, the examination should be correlated with clinical information, including thyroid function tests, thyroid physical examination, and recent medications or iodine ingestion. Although this document largely focuses on the use and scope of general nuclear medicine radiotracers where imaging, when performed, is with a gamma camera, it is important to be aware of other radiotracers used with positron emission tomography (PET), such as F-18-fluorodeoxyglucose (FDG) and gallium-68 DOTA-Tyr3-octreotate (^{68}Ga-DOTATATE) or (Cu 64)-N-[(4,7,10-Tricarboxymethyl-1,4,7,10 tetraazacyclododec-1-yl) acetyl]-Dphenylalanyl-L-cysteinyl-L-tyrosyl-D-tryptophanyl-L-lysyl-L-threoninyl-L-cysteinyl-L-threonine-cyclic (2-7) disulfide (^{64}Cu-DOTATATE). These may be briefly addressed in the alternative protocols mentioned in this document but also have separate Practice Parameters that can be accessed. When performing any thyroid imaging or intervention related to nuclear medicine,findings should be correlated with other available imaging examinations, such as computed tomography (CT), magnetic resonance imaging (MRI), PET with computed tomography (PET/CT) or with magnetic resonance imaging (PET/MRI), radiography, ultrasonography, and/or prior thyroid scintigraphy. Adherence to this Practice Parameter should optimize detection and characterization of abnormal thyroid morphology and function.

Application of this Practice Parameter should be in accordance with the ACR–ACNM–SNMMI–SPR Practice Parameter for the Use of Radiopharmaceuticals in Diagnostic Procedures [1].

Thyroid scintigraphy facilitates the detection of abnormalities of thyroid morphology, the correlation of morphology with function, and the detection of aberrant or metastatic functioning thyroid tissue, or residual native functioning thyroid tissue after therapy.

Thyroid uptake allows measurement of global function of the thyroid gland as reflected by the quantitative evaluation of radioiodine accumulation and kinetics.

II. INDICATIONS AND CONTRAINDICATIONS

A. Thyroid scintigraphy is useful in, but not limited to, evaluation of the following:
   1. Size and location of functioning thyroid tissue
   2. Overt and subclinical thyrotoxicosis
   3. Suspected focal masses or diffuse thyroid disease
   4. Clinical laboratory tests suggestive of abnormal thyroid function
   5. Function of thyroid nodules detected on physical examination or other imaging examinations
   6. Congenital thyroid abnormalities, including ectopia
   7. Differentiating hyperthyroidism from other forms of thyrotoxicosis (eg, subacute or chronic thyroiditis, struma ovarii, and thyrotoxicosis factitia)

B. Thyroid uptake is useful for the following:
   1. Differentiating hyperthyroidism from other forms of thyrotoxicosis (eg, subacute or chronic thyroiditis and thyrotoxicosis factitia) and determining the subsequent role of radioiodine therapy.
   2. Assessing the necessity and calculating iodine-131 sodium iodide administered activity for patients to be treated for hyperthyroidism (see the ACR–ACNM–ASTRO–SNMMI Practice Parameter for the Performance of Therapy With Radiopharmaceuticals) [2]

3. Assessing the amount of functional thyroid remnant following thyroidectomy for thyroid cancer.

C. Whole-body imaging for thyroid carcinoma is useful for determination of presence and location of the following:
   1. Residual functioning thyroid tissue or cancer in the neck after surgery for thyroid cancer or after ablative therapy with radioiodine
   2. Metastases from iodine-avid forms of thyroid cancer anywhere in the body.

D. Contraindications

Administration of iodine-131 sodium iodide to pregnant or lactating patients (whether currently breastfeeding or not) is contraindicated. Complete cessation of breastfeeding 6–12 weeks before administration of iodine-131 sodium iodide is recommended when such administration is vetted and deemed clinically appropriate. The delay in treatment is to decrease the radiation dose absorbed by the maternal breast tissue, and cessation of breastfeeding is to prevent the ingestion of radioactive breast milk by the nursing child [3-5]. Although breastfeeding must completely cease for the current postpartum instance at the time of radioiodine therapy , breastfeeding may be done for any future children.

The ACR–SPR Practice Parameter for Imaging Pregnant or Potentially Pregnant Patients with Ionizing Radiation provides useful information on radiation risks to the fetus regardless of source. Information on managing pregnant or potentially pregnant patients undergoing nuclear medicine procedures is available from the International Commission on Radiological Protection [6].

III. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

See the ACR–ACNM–SNMMI–SPR Practice Parameter for the Use of Radiopharmaceuticals in Diagnostic Procedures [1].

IV. SPECIFICATIONS OF THE EXAMINATION

The written or electronic request for thyroid scintigraphy and uptake measurements should provide sufficient information to demonstrate the medical necessity of the examination and allow for its proper performance and interpretation.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). Additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider. The accompanying clinical information should be provided by a physician or other appropriately licensed health care provider familiar with the patient's clinical problem or question and consistent with the state's scope of practice requirements. (ACR Resolution 35, adopted in 2006 – revised in 2016, Resolution 12-b)

IV. SPECIFICATIONS OF THE EXAMINATION

A. Thyroid Scintigraphy

1. Radiopharmaceutical

The preferred radiopharmaceutical for thyroid scintigraphy for benign disease is iodine-123 sodium iodide administered orally in a capsule or as a liquid. In adults, the administered activity is 0.1 to 0.4 mCi (3.7-14.8 MBq). For children, the administered activity should be 0.0075 mCi/kg (0.28 MBq/kg) with a minimum administered activity of 0.027 mCi (1 MBq) and a maximum administered activity of 0.3 mCi (11 MBq) [7]. Use of iodine-131 sodium iodide is strongly discouraged for imaging of benign disease because of its much greater radiation dose to the thyroid.

An alternative radiopharmaceutical is technetium-99m sodium pertechnetate administered intravenously. In adults, the administered activity is 2–10 mCi (74-370 MBq) [8]. For children, the administered activity is 0.03 mCi/kg (1.1 MBq/kg) with a minimum administered activity of 0.19 mCi (7 MBq) and maximum administered activity of 2.5 mCi (93 MBq) [7].

The choice between iodine-123 sodium iodide and technetium-99m sodium pertechnetate for thyroid scintigraphy depends on local practice and physician preference. The longer physical half-life (13.2 hours) and intrathyroidal organification of iodine-123 sodium iodide allows for improved target-to-background ratio, functional thyroid gland imaging, and RAIU. Technetium-99m has a higher photon flux, which results in shorter imaging times. It results in a lower radiation exposure to the thyroid, although the total body exposure is slightly higher. Technetium-99m is readily available from a molybdenum-99/technetium-99m generator and is less expensive than iodine-123 sodium iodide. Technetium-99m does not undergo thyroidal organification, and rapid thyroid washout of technetium-99m limits its use for quantitative assessment of thyroid uptake. Rarely, findings on radioiodine and technetium images may be discordant in nodular disease because pertechnetate is not handled by the same physiologic mechanism as iodine.

2. Pharmacologic considerations

Many medications interfere with the accumulation of radiopharmaceuticals in the thyroid gland.

Compounds That May Decrease Thyroid Iodine Uptake [9-12]

MEDICATION TIME*
Methimazole 3-7 days
Propylthiouracil 3-7 days
Perchlorate 1 week
Thiocyanate 1 week
Iodine-containing cough medicines and vitamins 4 weeks
Iodine solution (Lugol’s or SSKI**) 4-6 weeks
Iodine-containing topical agents 4 weeks
Kelp 4 weeks
Tri-iodothyronine (T_3) 2 weeks
Levothyroxine (T_4) 4-6 weeks
Thyroid extracts (desiccated thyroid extracts) 4-6 weeks
Intravenous iodinated contrast materials 1-2 months
Oil-based iodinated contrast materials 1-2 years
Amiodarone 3-6 months

*Time that patients should wait after medication is discontinued in order to obtain accurate uptake

**Saturated solution of potassium iodide

A thorough medical history should be obtained prior to administering the radiopharmaceutical and, if necessary, the examination should be delayed appropriately.

3. Patient

The patient should be placed in a supine position, with the neck comfortably extended. It may be helpful to gently immobilize the head. When indicated, the physician should palpate the thyroid gland while the patient is in the imaging position as well as when the patient is upright.

4. Imaging

With iodine-123 sodium iodide, planar/pinhole imaging in the anterior, left anterior oblique (LAO), and right anterior oblique (RAO) positions can commence as early as 3–4 hours or as late as 24 hours after administration. For technetium-99m pertechnetate, imaging should commence 5–30 minutes after injection. Radioactive sources or lead markers may be used to identify anatomic landmarks, such as the sternal notch and thyroid cartilage. The location of palpable nodules should be confirmed with a marker for anatomic correlation.

IV. SPECIFICATIONS OF THE EXAMINATION

B. Thyroid Uptake

1. Radiopharmaceutical

   If thyroid RAIU is performed in conjunction with thyroid scintigraphy, the activity administered for the scan will suffice for both. If the uptake is performed separately or in conjunction with a technetium-99m pertechnetate scan, as little as 0.1 mCi (3.7 MBq) of iodine-123 sodium iodide or 0.004–0.005 mCi (0.15-0.185 MBq) of iodine-131 sodium iodide may be used. If only a thyroid uptake with iodine-131 sodium iodide is obtained, the administered activity should not exceed 0.01 mCi (0.37 MBq).

2. Pharmacologic considerations: See section IV.A.2

3. Procedure

   The usual time of thyroid function measurement is approximately 24 hours after radiopharmaceutical administration. An additional uptake measurement may be performed at 4–6 hours, particularly in cases of suspected rapid iodine turnover. The percent uptake should be compared to normal values measured at the same time after radiopharmaceutical administration, if available. The patient should sit or lie with neck extended; an open-faced collimated detector probe should be directed at the neck, with the crystal usually no more than 20–30 cm away.

   There are several acceptable measurement and calculation techniques; the following is one example. Counts are acquired for 1 minute over the thyroid gland. Counts are then acquired over the patient's mid-thigh for 1 minute and at the same distance (eg, 20-30 cm), taking care to exclude the urinary bladder from the detector field. A standard (source of the same radiopharmaceutical of identical activity to that administered to the patient) or the radioiodine capsule being administered to the patient is placed in a standardized Lucite scattering neck phantom and counts are acquired for 1 minute using the same geometry. Correction for decay applies when measuring the counts from the radioiodine capsule. The room background counts also are acquired for 1 minute.
   The RAIU is calculated using the following formula:

$$\text{RAIU} = \frac{\textit{Neck Counts} - \textit{Thigh Counts}}{\textit{Phantom Counts} - \textit{Background}} \times 100\%$$

IV. SPECIFICATIONS OF THE EXAMINATION

C. Imaging for Thyroid Carcinoma

1. Radiopharmaceutical

Anterior and posterior whole-body radioiodine imaging for thyroid cancer can be performed either as a diagnostic examination (after administration of activity of radioiodine in the diagnostic range) or after administration of a therapeutic administered activity of iodine-131 sodium iodide. Diagnostic whole-body imaging can be performed with either iodine-123 sodium iodide or iodine-131 sodium iodide. Due to the reduced absorbed radiation dose of iodine-123 when compared to iodine-131, it is preferred in evaluation of differentiated thyroid cancer in children [13]. Image quality is better with iodine-123 sodium iodide, but its use may be limited by decreased sensitivity in detection of pulmonary metastases, commercial availability or cost [14,15]. The administration of I-131 requires a written directive in compliance with regulations; see ACR–AAPM–ACNM–SNMMI–SPR Technical Standard For Therapeutic Procedures Using Radiopharmaceuticals (rev. 2022).

a. Preparation

Thyroid hormone replacement should be withheld for a time sufficient, usually 4-6 weeks after near total or total thyroidectomy to render the patient hypothyroid (serum thyroid-stimulating hormone [TSH] level greater than 30 mU/L), or recombinant human thyroid-stimulating hormone (rhTSH; thyrotropin alpha, such as Thyrogen®) stimulation should be used according to an established protocol.

The use of a low-iodine diet may increase the efficacy of iodine-131 sodium iodide ablation by decreasing serum iodine levels, which can increase RAIU [16-18]. Subsequently, use of a low-iodine diet may also increase the sensitivity of the imaging examination. Typically, the low-iodine diet is started 1–2 weeks before radioiodine administration [16]. Measuring urinary iodine may be considered to evaluate efficacy of iodine restriction.

b. Procedures

i. Diagnostic Whole-Body Radioiodine Scintigraphy

Administered activity of 1.0–5.0 mCi (37-185 MBq) of iodine-131 sodium iodide is given orally, and imaging of the neck and the whole body is performed 24 to 72 hours later using a high-energy collimator designed for iodine-131 sodium iodide. The possibility of "stunning” may be reduced with less than 3 mCi. Optimally, the therapeutic activity should be administered within 72 hours of the diagnostic activity. Additional concomitant use of SPECT/CT increases the efficacy of diagnosing uptake foci [19]. Iodine-123 sodium iodide is considered an alternative radiopharmaceutical because of the "stunning” phenomenon that may be encountered when administering iodine-131 sodium iodide for pretherapy diagnostic scintigraphy [20]. Typically administered activity for iodine-123 sodium iodide is 1.5–5 mCi (55.5-185 MBq). If available, Iodine-124 is a positron agent with a higher sensitivity for detection of residual, recurrent disease, and for metastases. It has higher energy with better imaging characteristics, and without evidence of stunning [13].

In addition to whole-body anterior and posterior parallel-hole collimator images, spot views of the thyroid bed and neck in the anterior and RAO and LAO views may be obtained with a pinhole collimator [21], and, as needed, anterior and posterior images of the chest and abdomen obtained with a parallel-hole collimator may improve lesion detection. Single photon emission computed tomography (SPECT) imaging may be performed as needed. SPECT/CT imaging may replace or complement planar and pinhole imaging by improving anatomical localization, lesion detection, and diagnostic accuracy [22,23]. SPECT/CT may also change staging in certain patients and hence facilitate accurate radioiodine dosing [24].

Currently, consensus practice parameters for body weight–based administered activity of iodine-131 and iodine-123 for whole-body scintigraphy for children are not available. However, administered activity of 1.5–5 mCi, similar to adults, can be used. Activity range of 3–5 mCi of iodine-123 for whole-body scintigraphy has been used for children [25].

ii. Posttherapy Whole-Body Radioiodine Scintigraphy

Iodine-131 sodium iodide whole-body imaging may be performed 2–14 days (typically at 5-7 days) after thyroid ablative therapy to detect residual thyroid tissue in the neck and/or iodine-avid metastases that may not have been detected on pretherapy imaging examinations, if performed [26]. Some data suggest that imaging at 3 days and again with Iodine-131 sodium iodide whole-body imaging at 5-7 days could better determine if a tumor is refractory to I-131 therapy [43,44]. Uptake values may also be calculated for the residual thyroid tissue in the thyroid bed using the technique described in section IV.B.3.

c. Alternative protocols

Whole-body F-18-FDG-PET/CT may be used to evaluate patients who have a history of differentiated thyroid cancer that is not iodine avid and have elevated thyroglobulin levels [16]. FDG-PET/CT can detect metastatic disease and change patient management in suspected thyroid cancer recurrence [27]. Studies have demonstrated that stimulated TSH levels with thyroid hormone withdrawal or rhTSH may increase the sensitivity of FDG-PET/CT for the detection of metastatic thyroid cancer [28,29]. FDG-PET/CT could also be considered in the setting of anaplastic thyroid cancer.

In the setting of medullary thyroid cancer, ^{68}Ga-DOTATATE or ^{64}Cu-DOTATATE or other DOTA-analogues have utility and outperform ^{111}In-Octreoscan which had been used historically [30,31]. If clinically warranted and DOTATATE positive, ^{177}Lu-DOTATATE therapy could be considered [32,33]. Please refer to the ACR-ACNM-ASTRO-SNMMI Practice Parameter for Lutetium-177 (Lu-177) DOTATATE Therapy [34].

V. EQUIPMENT SPECIFICATIONS

Equipment performance monitoring should be in accordance with the ACR–AAPM Technical Standard for Nuclear Medical Physics Performance Monitoring of Gamma Cameras [35].

A. Thyroid Imaging

Typically, a gamma camera equipped with a pinhole collimator is used. Images are acquired in the anterior, and often both anterior oblique, projections for a minimum of 100,000 counts or 8 minutes, whichever occurs first [8]. The distance between the collimator aperture and the neck should be such that the thyroid occupies most of the field of view. With pinhole collimators, significant geometric distortion occurs. Additional views with a parallel-hole collimator may be useful when searching for ectopic tissue or estimating thyroid size. Collimator choice should be appropriate to the radiopharmaceutical used.

B. Thyroid Uptake

A thyroid probe is typically used. A gamma camera with a parallel-hole collimator may be used instead of a probe, but the use of a standardized neck phantom remains necessary.

C. Imaging for Thyroid Carcinoma

For iodine-131 sodium iodide imaging, a high-energy collimator should be used with an appropriately shielded detector head. Pinhole collimator imaging of the thyroid bed may also be useful.
Whole-body imaging examinations are acquired with a high-energy collimator for iodine-131 sodium iodide. For imaging with iodine-123 sodium iodide, using a medium-energy collimator rather than a low-energy collimator may improve image quality due to down scatter from a small amount of high-energy photons

with photon energies greater than 300 keV [36,37]. If a low-energy collimator is used, down scatter correction should be applied [38,39]. The whole-body scan for iodine-123 sodium iodide may be performed 18 to 24 hours after administration at a scan speed of 8 cm/min, matrix of 256 × 1,024. Typically for iodine-131 sodium iodide, whole-body imaging is performed in anterior and posterior images as a whole-body sweep (typically 4 cm/min for approximately 30 minutes, from head to knees). Another protocol is 8 cm/min with a 256 × 256 matrix for anterior and posterior images [40]. In some patients, such as young children, it may be easier to acquire multiple planar images. If static planar images will be used, all images should be acquired for the same period of time to facilitate image comparison. Typically for iodine-131 sodium iodide, images of the torso are planned to acquire 300,000–500,000 counts. In some situations it may be helpful to image the thyroid bed with a pinhole collimator or to calculate thyroid bed RAIU as part of pretherapy imaging [21].

Adding SPECT/CT for further localization of findings is recommended ad hoc and has been shown to be an important diagnostic tool and enhances sensitivity for staging and risk stratification in thyroid cancer patients [41].

VI. DOCUMENTATION

Reporting should be in accordance with the ACR Practice Parameter for Communication of Diagnostic Imaging Findings [42].

The report should include the radiopharmaceutical used, the administered activity, and route of administration, any other pharmaceuticals administered, as well as the dose and route of administration.

VII. RADIATION SAFETY

Radiologists, medical physicists, non-physician radiology providers, radiologic technologists, and all supervising physicians have a responsibility for safety in the workplace by keeping radiation exposure to staff, and to society as a whole, "as low as reasonably achievable" (ALARA) and to assure that radiation doses to individual patients are appropriate, taking into account the possible risk from radiation exposure and the diagnostic image quality necessary to achieve the clinical objective. All personnel who work with ionizing radiation must understand the key principles of occupational and public radiation protection (justification, optimization of protection, application of dose constraints and limits) and the principles of proper management of radiation dose to patients (justification, optimization including the use of dose reference levels). https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1775_web.pdf

Facilities and their responsible staff should consult with the radiation safety officer to ensure that there are policies and procedures for the safe handling and administration of radiopharmaceuticals in accordance with ALARA principles. These policies and procedures must comply with all applicable radiation safety regulations and conditions of licensure imposed by the Nuclear Regulatory Commission (NRC) and by applicable state, local, or other relevant regulatory agencies and accrediting bodies, as appropriate. Quantities of radiopharmaceuticals should be tailored to the individual patient by prescription or protocol, using body habitus or other customized method when such guidance is available.

Nationally developed guidelines, such as the ACR's Appropriateness Criteria®, should be used to help choose the most appropriate imaging procedures to prevent unnecessary radiation exposure.

Additional information regarding patient radiation safety in imaging is available from the following websites – Image Gently® for children (www.imagegently.org) and Image Wisely® for adults (www.imagewisely.org). These advocacy and awareness campaigns provide free educational materials for all stakeholders involved in imaging (patients, technologists, referring providers, medical physicists, and radiologists).

Radiation exposures or other dose indices should be periodically measured by a Qualified Medical Physicist in accordance with the applicable ACR Technical Standards. Monitoring or regular review of dose indices from patient imaging should be performed by comparing the facility's dose information with national benchmarks, such as the ACR Dose Index Registry and relevant publications relying on its data, applicable ACR Practice Parameters, NCRP Report No. 172, Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States or the Conference of Radiation Control Program Director's National Evaluation of X-ray Trends; 2006, 2009, amended 2013, revised 2023 (Res. 2d).

VIII. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL, AND PATIENT EDUCATION

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control, and Patient Education appearing under the heading *Position Statement on QC & Improvement, Safety, Infection Control*, *and Patient Education* on the ACR website (https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Quality-Control-and-Improvement).

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*Practice parameters and technical standards are published annually with an effective date of October 1 in the year in which amended, revised or approved by the ACR Council. For practice parameters and technical standards published before 1999, the effective date was January 1 following the year in which the practice parameter or technical standard was amended, revised, or approved by the ACR Council.

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