# TheASRTPractice Standarc for Medical Imaging an Radiation Therap

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# Preface

These practice standards serve as a guide for the medical imaging and radiation therapy profession. These standards define the practice and establish general criteria to determine compliance. Practice standards are authoritative statements established by the profession through evidentiary documentation, for evaluating the quality of practice, service and education provided by individuals within the profession.

Practice standards can be used by individual facilities to develop job descriptions and practice parameters. Those outside the profession can use the standards as an overview of the role and responsibilities of individuals within the profession.

The medical imaging and radiation therapy professional and any individual who is legally authorized to perform medical imaging or radiation therapy must be educationally prepared and clinically competent as a prerequisite to professional practice. The individual should, consistent with all applicable legal requirements and restrictions, exercise individual thought, judgment and discretion in the performance of the procedure. Federal and state statutes, regulations, accreditation standards and institutional policies could dictate practice parameters and may supersede these standards.

## Format

The ASRT Practice Standards for Medical Imaging and Radiation Therapy are divided into five sections:

- Introduction – defines the practice and the minimum qualifications for the education and certification of individuals in addition to an overview of the specific practice.
- Medical Imaging and Radiation Therapy Scope of Practice – delineates the parameters of the specific practice.
- Standards – incorporate patient assessment and management with procedural analysis, performance and evaluation. The standards define the activities of the individual responsible for the care of patients and delivery of medical imaging and radiation therapy procedures; in the technical areas of performance, such as equipment and material assessment safety standards and total quality management and in the areas of education, interpersonal relationships, self-assessment and ethical behavior.
- Advisory Opinion Statements – provide explanations of the practice standards and are intended for clarification and guidance for specific practice issues
- Glossary – defines terms used in the practice standards document.

The standards are numbered and followed by a term or set of terms that describes the standards. The next statement is the expected performance of the individual when performing the procedure or treatment. A rationale follows and explains why an individual should adhere to the particular standard of performance.

- Criteria – used to evaluate an individual's performance. Each standard is divided into two parts: the general criteria and the specific criteria. Both should be used when evaluating performance.

# Definition

## Introduction

The medical imaging and radiation therapy profession comprises health care professionals identified as a bone densitometry technologist, cardiac interventional and vascular interventional technologist, computed tomography technologist, limited x-ray machine operator, magnetic

Bone Densitometry

The practice of bone densitometry is performed by health care professionals responsible for the administration of ionizing radiation for diagnostic, therapeutic or research purposes. A bone densitometry technologist performs bone densitometry procedures and acquires and analyzes data needed for diagnosis at the request of and for interpretation by a licensed practitioner.

Bone densitometry technologists independently perform or assist the licensed practitioner in the

## Medical Dosimetry

The practice of medical dosimetry is performed by health care professionals responsible for designing a treatment plan for use in the administration of ionizing radiation for the purpose of treating diseases, primarily cancer. Medical dosimetrists independently perform duties and complete responsibilities under the supervision of qualified medical physicists and radiation oncologists. Medical dosimetrists generate an optimal treatment plan and ensure the appropriate transfer of data that the radiation therapist will use to treat the patient.

Medical dosimetrists must maintain a high degree of accuracy, thoroughness and safety in treatment planning optimization, treatment techniques and positioning. Medical dosimetrists assist the radiation oncologist in localizing the treatment area, generate a treatment plan and communicate with the radiation oncology team to enable and ensure the appropriate transfer of information.

## Nuclear Medicine

The practice of nuclear medicine is performed by health care professionals responsible for the administration of ionizing radiation (radioactive material and computed tomography), nonionizing radiation and adjunctive medications for diagnostic, therapeutic, radiotheranostics or research purposes. Radioactive materials, medications and imaging and nonimaging equipment are used in nuclear medicine and molecular imaging to study various organs, body systems and samples to aid in the diagnosis, treatment, radiotheranostics and treatment planning of various pathological conditions. A nuclear medicine technologist performs nuclear medicine and molecular imaging procedures, radiotheranostics or therapies, and acquires and analyzes data at the request of and for

Radiologist Assistant

A radiologist assistant practices under the supervision of a radiologist and enhances patient care in radiology services. As a member of the radiologist-led team, the radiologist assistant performs invasive and noninvasive procedures at the request of and for interpretation by a radiologist.

Radiologist assistants act as liaisons between patients, radiographers, radiologists and other members of the health care team. Radiologist assistants remain sensitive to the physical, cultural and emotional needs of patients through communication, comprehensive patient assessment, Radiologist assistantsm1ainta

# Education and Certification

## Introduction

Medical imaging and radiation therapy professionals must be educationally prepared and clinically competent as a prerequisite to professional practice. Only medical imaging and radiation therapy professionals who have completed the appropriate education and training as outlined in these standards should perform medical imaging and radiation therapy procedures.

Radiation Therapy

Only medical imaging and radiation therapy professionals who have completed the appropriate

Sonography

Only medical imaging and radiation therapy professionals who have completed the appropriate education and obtained certification(s) as outlined in these standards should perform sonographic and molecular imaging procedures.

Sonographers prepare for their roles on the interdisciplinary team by meeting primary or postprimary examination eligibility criteria as determined by the ARDMS, ARRT or CCI.

Those who have passed the ARDMS examination(s) use the credential(s) RDCS, RDMS, RMSKS or RVT.

Those who have passed the ARRT primary examination use the credential R.T.(S) or R.T.(VS).

Those who have passed the CCI examination(s) use the credential(s) RCCS, RCS, RPhS or RVS.

Those who have passed the ARRT breast sonography, sonography or vascular sonography postprimary examinations use the additional credentials (BS), (S) or (VS), respectively

# Medical Imaging and Radiation Therapy Scope of Practice

Scopes of practice delineate the parameters of practice and identify the boundaries for practice. A comprehensive procedure list for the medical imaging and radiation therapy professional is impractical because clinical activities vary by the practice needs and expertise of the individual. As medical imaging and radiation therapy professionals gain more experience, knowledge and clinical competence, the clinical activities may evolve.

The scope of practice of the medical imaging and radiation therapy professional includes:

- Administering medications enterally, parenterally, through new or existing vascular access or through other routes as prescribed by a licensed practitioner.*†
- Administering medications with an infusion pump or power injector as prescribed by a licensed practitioner.*†
- Applying principles of ALARA to minimize exposure to patient, self and others.
- Applying principles of patient safety during all aspects of patient care.
- Assisting in maintaining medical records while respecting confidentiality and established policy.
- Corroborating a patient's clinical history with the procedure and ensuring information is documented and available for use by a licensed practitioner.
- Educating and monitoring students and other health care providers.*
- Evaluating images for proper positioning and determining if additional images will improve the procedure or treatment outcome.
- Evaluating images for technical quality and ensuring proper identification is recorded.
- Identifying and responding to emergency situations.
- Identifying, calculating, compounding, preparing and/or administering medications as prescribed by a licensed practitioner.*†
- Performing ongoing quality assurance activities.
- Performing point of care testing as prescribed by a licensed practictioner.†
- Performing venipuncture as prescribed by a licensed practitioner.*†
- Postprocessing data.
- Preparing patients for procedures.
- Providing education.
- Providing input for equipment and software purchase and supply decisions when appropriate or requested.
- Providing optimal patient care.
- Receiving, relaying and documenting verbal, written and electronic orders in the patient's medical record.
- Selecting the appropriate protocol and optimizing technical factors while maximizing patient safety.
- Starting, maintaining and/or removing intravenous access as prescribed by a licensed practitioner.*†
- Verifying archival storage of data.
- Verifying informed consent for applicable procedures.*

* Excludes limited x-ray machine operator

† Excludes medical dosimetry

Bone Densitometry

- Performing bone densitometry procedures as prescribed by a licensed practitioner.

Cardiac- Interventional and Vascular -Interventional

- Assisting licensed practitioner or radiologist assistant with fluoroscopic and specialized interventional radiography procedures.
- Maintaining intra-arterial access as prescribed by a licensed practitioner.
- Panning the procedure table during image production.
- Participating in physiologic monitoring of patients.
- Performing diagnostic/interventional procedures as prescribed by a licensed practitioner
- Performing manual and mechanical hemostasis, including the use of vascular closure devices, as prescribed by a licensed practitioner.
- Performing noninterpretive fluoroscopic procedures as prescribed by a licensed practitioner.
- Placing, maintaining and removing peripherally inserted central catheters as prescribed by a licensed practitioner.

Computed Tomography

- Assisting a licensed practitioner or radiologist assistant with interventional computed tomography procedures.
- Performing computed tomography and molecular imaging procedures as prescribed by a licensed practitioner.

Limited X-ray Machine Operator

- Assisting a licensed practitioner or radiographer during static radiographic procedures.
- Performing diagnostic radiographic procedures within the limited scope of practice as prescribed by a licensed practitioner

Magnetic Resonance

- Applying principles of magnetic resonance safety to minimize risk to patient, self and others.
- Assisting the licensed practitioner or radiologist assistant with magnetic resonance interventional procedures.
- Performing magnetic resonance and molecular imaging procedures as prescribed by a licensed practitioner.
- Selecting appropriate pulse sequences with consideration given to established protocols and other factors influencing data acquisition parameters.

Mammography

- Imaging pathologic breast specimens as prescribed by a licensed practitioner.
- Performing breast ultrasound procedures as prescribed by a licensed practitioner.
- Performing mammographic procedures per facility policy or as prescribed by a licensed practitioner.
- Performing or assisting with clinical breast examination

Medical Dosimetry

- Designing and generating optimal treatment plans in collaboration with a radiation oncologist.
- Evaluating treatment plans for accuracy.
- Monitoring doses to normal tissues within the irradiated volume to ensure tolerance levels are not exceeded.
- Obtaining and incorporating patient data from medical imaging procedures or manual methods to be used in simulation, treatment planning, treatment delivery and quality assurance.
- Participating in brachytherapy treatment planning and delivery.
- Participating in simulation under the supervision of a radiation oncologist.
- Performing dosimetric calculations.
- Performing or assisting with the fabrication of patient immobilization and other treatment devices.
- Transferring and documenting treatment planning data according to departmental policy.

Nuclear Medicine

- Applying principles of magnetic resonance safety to minimize risk to patient, self and others when performing PET-MR.
- Assembling, calibrating, maintaining, eluting and administering radiopharmaceuticals from the radionuclide infusion system and the generator while complying with standards and as prescribed by a licensed practitioner and under the supervision of an authorized user.
- Performing hybrid imaging, including PET-CT, PET-MR and SPECT-CT for emission, transmission, attenuation correction, anatomical location and for use in radiation therapy treatment planning when performed within hybrid imaging as prescribed by a licensed practitioner and under the supervision of an authorized user.
- Performing nuclear medicine and molecular imaging procedures, radiotheranostics or therapies as prescribed by a licensed practitioner and under the supervision of an authorized user.
- Procuring, identifying, calculating, preparing and/or administering ionizing radiation (radioactive material and computed tomography) and nonionizing radiation as prescribed by a licensed practitioner and under the supervision of an authorized user.

Quality Management

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Radiologist Assistant

- Assessing, monitoring and managing patient status, including patients under minimal and moderate sedation.
- Assisting with data collection and review for clinical trials or other research.
- Communicating the supervising radiologist's report to the appropriate health care provider consistent with the ACR Practice Guidelines for Communication of Diagnostic Imaging Findings.
- Completing patient history and physical.
- Emphasizing patient safety and verifying procedure appropriateness by analyzing and incorporating evidence-based practices for optimal patient care.
- Evaluating images for completeness and diagnostic quality and recommending additional images.
- Identifying and administering radioactive materials as prescribed by a supervising radiologist and under the supervision of an authorized user.
- Identifying variances that may influence the expected outcome through preprocedur6 (i)-2 (ndi)-

# Standards

## Standard One – Assessment

The medical imaging and radiation therapy professional collects pertinent data about the patient, procedure, equipment and work environment.

### Rationale

Information about the patient's health status is essential in providing appropriate imaging and therapeutic services. The planning and provision of safe and effective medical services relies on the collection of pertinent information about equipment, procedures and the work environment

The medical imaging and radiation therapy professional:

### General Criteria

- Assesses and maintains the integrity of medical supplies and medications, properly disposing when indicated
- Assesses any potential patient limitations for the procedure.
- Assesses factors that may affect the procedure.
- Assesses patient lab values, medication list and risk for allergic reaction(s) prior to procedure and administration of medication.*†
- Confirms that equipment performance, maintenance and operation comply with the manufacturer's specifications.
- Determines that services are performed in a safe environment, minimizing potential hazards.
- Maintains restricted access to controlled areas.
- Obtains and reviews relevant previous procedures and information from all available resources and the release of information as needed
- Recognizes signs and symptoms of an emergency.
- Verifies appropriateness of the requested or prescribed procedure, in compliance with the clinical indication and protocol.
- Verifies patient identification.
- Verifies that protocol and procedure manuals include recommended criteria and are reviewed and revised.
- Verifies that the patient has consented to the procedure.
- Verifies the patient's pregnancy status.

### Specific Criteria

#### Bone Densitometry

- Assesses patient compliance with prescribed treatment as it relates to the procedure.

* Excludes limited x-ray machine operator
† Excludes medical dosimetry

Cardiac- Interventional and Vascular -Interventional

Refer to general criteria.

Computed Tomography

- Verifies that a registered technologist is physically present at the CT console to perform a remote CT procedure.

Limited X -ray Machine Operator

- Develops and maintains standardized exposure technique guidelines for all equipment
- Maintains and performs quality control on radiation safety equipment

Magnetic Resonance

- Assesses patient for factors that may contribute to anxiety or claustrophobia.
- Identifies and removes items that may affect safety, damage the equipment or affect the image quality.
- Screens patient and others for potential magnetic resonance contraindications, either within the body or on their person, prior to entering the magnet room.
- Verifies that a registered technologist with MR Level 2 Personnel training is physically present at the MR console throughout a remote MR procedure.

Mammography

- Assesses the need for alternative procedures based on the patient's age, hormonal status and the presence of surgical implants.
- Assists in setting policy and procedures in the facility to meet certification and accreditation standards specific to breast imaging.
- Establishes all required quality assurance and quality control test criteria.

Medical Dosimetry

- Assesses the patient's need for information and reassurance.
- Reviews patient history for previous therapeutic treatments.

Radiologist Assistant

- Assesses the patient’s level of anxiety and pain and informs the supervising radiologist.
- Interviews patient to obtain, verify and update medical history.
- Observes and assesses a patient who has received minimal and moderate sedation.
- Performs a history and physical examination, analyzes data, and reports findings as part of a radiologist-led team.
- Performs area monitoring and surveys to assess radiation exposure levels and contamination sites.
- Verifies the patient's lactation or breastfeeding status.

Sonography

Refer to general criteria.

* Excludes limited x-

Limited X -ray Machine Operator

- x Develops, maintains and makes available optimal exposure technique guidelines for all radiographic equipment.

Magnetic Resonance

- x Reviews the patient's medical record and licensed practitioner's request to determine optimal protocol and imaging parameters for clinical indications.
- x Selects appropriate imaging coil.

Mammography

Refer to general criteria.

Medical Dosimetry

- x Gathers and analyzes pertinent data relevant to the treatment planning and delivery process.
- x Participates in reviewing patient treatment parameters and dose records to ensure treatment does not exceed the prescribed dose or normal tissue tolerances.
- x Recommends the appropriate immobilization devices and positioning aids for simulation and treatment.
- x Recommends when to hold treatment until a radiation oncologist is notified.

Radiation Therapy

- Determines when to contact the radiation oncologist or licensed practitioner regarding patient side effects or questions.
- Determines when to withhold treatment until a radiation oncologist is contacted.
- Ensures the appropriate imaging technique is chosen for image-guided radiation therapy procedures.
- Participates in decisions about appropriate simulation techniques and treatment positions.
- Reviews doses daily to ensure that treatment does not exceed prescribed dose, normal tissue tolerance or treatment protocol constraints.
- Reviews patient treatment plan and prescription prior to initial treatment delivery.
- Reviews patient treatment records prior to each treatment for prescription or treatment proce

Standard Three – Education

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* Excludes limited x-ray machine operator
† Excludes medical dosimetry

Cardiac- Interventional and Vascular -Interventional

- Maintains competency in the use of diagnostic and interventional devices.

Specific Criteria

Bone Densitometry

- Applies the concepts of accuracy and precision in bone densitometry.
- Confirms patient position matches the selected scan parameters.
- Scans alternate sites when indicated.

Cardiac- Interventional and Vascular -Interventional

- Coordinates and manages the collection and labeling of tissue and fluid specimens.
- Monitors ECG, blood pressure, respiration, oxygen saturation, level of consciousness and pain pre-, peri- and post-procedure.

Computed Tomography

- Adheres to protocol scan length to optimize patient dose.
- Confirms patient position matches the selected scanning orientation parameters.
- Coordinates and manages the collection and labeling of tissue and fluid specimens.
- Determines optimum placement of ECG electrodes and correctly identifies ECG wave trigger.
- Optimizes technical factors to minimize radiation exposure to the patient while maintaining diagnostic image quality.
- Performs a remote CT procedure when a registered technologist is physically present with the patient.
- Uses radiation shielding devices.
- Utilizes isocentering of the anatomy of interest to optimize dose.

Limited X -ray Machine Operator

- Reviews patient exposure records and reject analyses as part of the quality assurance program.
- Uses appropriate uniquely identifiable pre-

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Mammography

- Applies appropriate radiopaque markers to the bransie-1 ( )]TJ (, )]TJ (c]TJ a]TJ -1 ( t)Tj - Td( )Tj EM

Nuclear Medicine

- Administers radioactive material enterally, parenterally through new or existing vascular access devices or through other routes

Radiation Therapy

- Achieves precision patient alignment using imaging and external markings.
- Assists the radiation oncologist in determining the optimum treatment field to cover the target volume.
- Calculates monitor units and treatment times.
- Consults with medical physicist and/or engineer in performing and documenting the quality assurance checks.
- Creates and manages simulation and verification images.
- Demonstrates safe handling, storage and disposal of brachytherapy sources.
- Exports data to treatment planning systems.
- Makes the decision to discontinue patient treatment until equipment is operating properly.
- Monitors the patient visually and aurally during treatment.
- Monitors the treatment console during treatment.
- Obtains radiation oncologist's approval of simulation images prior to initiation of treatment.
- Performs clinically indicated treatment imaging and motion management techniques
- Performs quality assurance checks on simulator, treatment unit and appropriate equipment.
- Prepares or assists in the preparation of brachytherapy sources and equipment.
- Uses knowledge of biological effects of ionizing radiation on tissue to minimize radiation dose to normal tissues.
- Verifies that only the patient is in the treatment room prior to initiating treatment or any imaging procedures.

Radiography

- Coordinates and manages the collection and labeling of tissue and fluid specimens.
- Reviews patient exposure records and reject analyses as part of the quality assurance program.
- Uses appropriate uniquely identifiable pre-exposure radiopaque markers for anatomical and procedural purposes.
- Uses pre-exposure collimation and proper field-of-view selection.

## Standard Five – Evaluation

The medical imaging and radiation therapy professional determines whether the goals of the action plan have been achieved, evaluates quality assurance results and establishes an appropriate action plan.

### Rationale

Careful examination of the procedure is important to determine that expected outcomes have been met. Equipment, materials and processes depend on ongoing quality assurance activities that evaluate performance based on established guidelines.

The medical imaging and radiation therapy professional:

### General Criteria

- Communicates the revised action plan to appropriate team members.
- Completes the evaluation process in a timely, accurate and comprehensive manner.
- Confirms data is accurate and complete.
- Develops a revised action plan to achieve the intended outcome.
- Evaluates images for optimal demonstration of anatomy of interest.
- Evaluates quality assurance results.
- Evaluates the patient, equipment and procedure to identify variances that might affect the expected outcome.
- Identifies exceptions to the expected outcome.
- Measures the procedure against established policies, protocols and benchmarks.
- Validates quality control testing conditions and results.

### Specific Criteria

#### Bone Densitometry

- Evaluates and identifies unexpected serial bone mineral density changes.
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Magnetic Resonance

Refer to general criteria.

Mammography

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Medical Dosimetry

- Develops additional treatment plans to achieve an optimal dose distribution.
- Ensures accuracy in the transfer and documentation of treatment parameters, according to departmental policies.
- Reviews and implements treatment field changes indicated on simulation or verification images as directed by a radiation oncologist.

Nuclear Medicine

- Employs devices to minimize radiation levels.
- Manages radioactive contamination and uses decontamination procedures.
- Performs additional images or data collections as needed.

Quality Management

- Develops policies, protocols and guidelines in collaboration with other health care providers.

Radiation Therapy

- Collaborates with radiation oncologists, medical physicists and medical dosimetrists to compensate for treatment inaccuracies.
- Establishes congruence between verification images and simulation images, digitally reconstructed radiographs and/or treatment volumes as defined by the radiation oncologist.
- Formulates recommendations for process improvements to minimize treatment discrepancies.
- Implements treatment plan or treatment field changes as directed by the radiation oncologist.
- Reports deviations from the standard or planned treatment.

Radiography

Refer to general criteria.

Radiologist Assistant

- Manages radioactive contamination and uses decontamination procedures.

Sonography

Refer to general criteria.

Standard Seven – Outcomes Measurement

The medical imaging and radiation therapy professional reviews and evaluates the outcome of the procedure according to quality assurance standards.

Rationale
To evaluate the quality of care, the medical imaging and radiation therapy professional compares the actual outcome with the expected outcome. Outcomes assessment is an integral part of the ongoing quality management action plan to enhance services.

The medical imaging and radiation therapy professional:

General Criteria

- Assesses the patient's physical, emotional and mental status prior to discharge.
- Evaluates the process and recognizes opportunities for future changes.
- Measures and evaluates the results of the revised action plan.
- Reviews all data for completeness and accuracy.
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## Standard Eight – Documentation

The medical imaging and radiation therapy professional documents information about patient care, procedures and outcomes.

Rationale
Clear and precise documentation is essential for continuity of care, accuracy of care and quality assurance.

The medical imaging and radiation therapy professional:

General Criteria

- Archives images or data.
- Documents diagnostic, treatment and patient data in the medical record in a timely, accurate and comprehensive manner.
- Documents medication administration in patient's medical record.*†
- Documents procedural timeout.
- Documents unintended outcomes or exceptions from the established criteria.
- Maintains documentation of quality assurance activities, procedures and results.
- Provides pertinent information to authorized individuals involved in the patient's care.
- Records information used for billing and coding procedures.
- Reports any out-of-tolerance [illegible]

* Excludes limited x-ray machine operator
† Excludes medical dosimetry

Magnetic Resonance

Refer to general criteria.

Mammography

- Documents and provides evidence of quality assurance and quality control outcomes according to established guidelines

Medical Dosimetry

- Reports any treatment variances in accordance with departmental, institutional and national quality assurance guidelines.

Nuclear Medicine

- Documents dose and route of administered radiopharmaceutical or radionuclide therapy in the patient medical record.
- Documents instrumentation quality testing procedures and maintains results for review.
- Documents radioactive materials quality testing procedures and maintains results for inspection.
- Documents the implementation, evaluation and modification of the radiation safety plan under the authority of the RSO
- Maintains records of the receipt, administration and disposal of radioactive materials.

Quality Management

- Documents goals and outcomes based on data analysis.
- Documents process flow variances and justifies exceptions.
- Documents steps used to improve processes.
- Updates institutional policies, protocols and guidelines to ensure continuous compliance with regulatory requirements
- Provides reports as required by institutional policy, accrediting bodies and federal and state regulations.

Radiation Therapy

- Documents radiation exposure parameters.
- Maintains imaging and treatment records according to institutional policy.
- Reports any treatment discrepancies to appropriate personnel

Radiologist Assistant

- Communicates and documents radiologist's order to other health care providers.
- Documents a history and physical examination in the patient record.
- Documents administration of medications.
- Documents and assists radiologist in quality reporting measures for the purpose of improved patient care.
- Documents dose and route of administered radiopharmaceutical in the patient medical record.
- Documents the implementation, evaluation and modification of the radiation safety plan under the authority of the RSO.
- Documents use of minimal and moderate sedation.
- Reports clinical and imaging observations and procedure details to the supervising radiologist.

Sonography

- Documents initial impressions and technical data.
- Records interval changes in sonographic findings compared to previous imaging.

## Standard Nine – Quality

The medical imaging and radiation therapy professional strives to provide optimal care.

### Rationale
Patients expect and deserve optimal care during diagnosis and treatment.

The medical imaging and radiation therapy professional:

### General Criteria
- Adheres to standards, policies, statutes, regulations and established guidelines
- Anticipates, considers and responds to the needs of a diverse patient population.
- Applies professional judgment and discretion while performing the procedure.
- Collaborates with others to elevate the quality of care.
- Participates in ongoing quality assurance programs.

### Specific Criteria

#### Bone Densitometry
- Advocates that facilities determine precision error and calculate the least significant change.

#### Cardiac- Interventional and Vascular -Interventional
Refer to general criteria.

#### Computed Tomography
- Advocates that facilities performing remote CT require a registered technologist be physically present with the patient.

#### Limited X -ray Machine Operator
Refer to general criteria.

#### Magnetic Resonance
- Advocates the need for a minimum of one registered magnetic resonance technologist and one additional MR Level 2 Personnel as the standard for safe and efficient delivery of magnetic resonance procedures.

#### Mammography
Refer to general criteria.

#### Medical Dosimetry
Refer to general criteria.

Nuclear Medicine

- Performs procedures in accordance with the NRC or in agreement with state regulations.

Quality Management

- Verifies the achievement of goals and identifies exceptions.

Radiation Therapy

- Performs procedures in accordance with the NRC or in agreement with state regulations
- Promotes patient safety by performing external beam treatments with a minimum of two registered radiation therapists.

Radiography

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## Standard Ten – Self-Assessment

The medical imaging and radiation therapy professional evaluates personal performance.

Rationale
Self-assessment is necessary for personal growth and professional development.

The medical imaging and radiation therapy professional:

General Criteria

- Assesses personal work ethics, behaviors and attitudes.
- Evaluates performance, applies personal strengths and recognizes opportunities for educational growth and improvement.
- Recognizes hazards associated with their work environment and takes measures to mitigate them.

Specific Criteria

Bone Densitometry

Refer to general criteria.

Cardiac- Interventional and Vascular -Interventional

Refer to general criteria.

Computed Tomography

Refer to general criteria.

Limited X-ray Machine Operator

- Investigates avenues to continue progress to become a registered radiographer.

Magnetic Resonance

Refer to general criteria.

Mammography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Nuclear Medicine

Refer to general criteria.

Quality Management

Refer to general criteria.

Radiation Therapy

Refer to general criteria.

Radiography

Refer to general criteria.

## Standard Eleven – Collaboration and Collegiality

The medical imaging and radiation therapy professional promotes a positive and collaborative practice atmosphere with other members of the health care team.

Rationale
To provide quality patient care, all members of the health care team must communicate effectively and work together efficiently.

The medical imaging and radiation therapy professional:

General Criteria

- Develops and maintains collaborative partnerships to enhance quality and efficiency.
- Informs and ins
- Promotes u

## Standard Twelve – Ethics

The medical imaging and radiation therapy professional adheres to the profession's accepted ethical standards.

### Rationale

Decisions made and actions taken on behalf of the patient are based on a sound ethical foundation.

The medical imaging and radiation therapy professional:

### General Criteria

- Accepts accountability for decisions made and actions taken.
- Acts as a patient advocate.
- Adheres to the established ethical standards of recognized certifying agent and

## Standard Thirteen – Research, Innovation and Professional Advocacy

The medical imaging and radiation therapy professional participates in the acquisition and dissemination of knowledge and the advancement of the profession.

Rationale
Participation in professional organizations and scholarly activities advances the profession.

The medical imaging and radiation therapy professional:

General Criteria

- Adopts new best practices.
- Advocates for an ergonomically safe work environment based on evidence-based practices.
- Investigates innovative methods for application in practice.
- Monitors changes to federal and state laws, regulations and accreditation standards affecting area(s) of practice.

Mammography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Nuclear Medicine

Refer to general criteria.

Quality Management

Refer to general criteria.

Radiation Therapy

Refer to general criteria.

Radiography

Refer to general criteria.

Radiologist Assistant

Refer to general criteria.

Sonography

- Advocates for an ergonomically safe working environment, based on evidence-based practices, to mitigate the risk of work-related musculoskeletal disorders.

# Advisory Opinion Statements

Advisory opinion statements provide explanations of the practice standards.

ASRT issues advisory opinions to clarify what constitutes appropriate practice and offer guidance for specific practice issues.

The profession holds medical imaging and radiation therapy professionals responsible and accountable for rendering safe, effective clinical services to patients and for judgments exercised and actions

## Guidance for the Communication of Clinical and Imaging Observations and Procedure Details by Radiologist Assistants to Supervising Radiologists

After research of evidentiary documentation, the ASRT issued opinions contained herein.

### Advisory Opinion

It is the opinion of the ASRT based on evidentiary documentation and where federal or state law and/or institutional policy permits that:

1. Communication of clinical and imaging observations and procedure details by the radiologist assistant to the supervising radiologist is an integral part of radiologist assistant practice. Without clear, consistent and appropriate communication between members of the radiology team, there is a possibility of inadequate patient care, incomplete reports and diminished departmental productivity. To create a safe and productive radiology environment, communication between the radiologist assistant and supervising radiologist must (e)-6 (4 (d de)4 (pa)4 (r)3 (t)-2 (m)-2 (e)4 (nt)-J 1 0 0 rg d (e)4 (nt)dov4 (l any (t)-TJ -0.0w)

- Documents and assists radiologist in quality reporting measures for the purpose of improved patient care. (Standard Eight, radiologist assistant only)
- Reports clinical and imaging observations and prporadiologist a

* Excludes limited x-ray machine operator
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QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- x Scope of Practice
  - o Administering medications enterally, parenterally through new or existing vascular access or through other routes as prescribed by a licensed practitioner.*
  - o Administering medications with an infusion pump or power injector as prescribed by a licensed practitioner.*†
  - o Identifying, calculating, compounding, preparing and/or administering medications as prescribed by a licensed practitioner.*†

QUALITY OF EVIDENCE: High

Federal and State Statute References
Not applicable

Other
Not applicable

* Excludes limited x-ray machine operator
† Excludes medical dosimetry

# Medication Administration Through New or Existing Vascular Access *†

After research of evidentiary documentation, the ASRT issued opinions contained herein.

## Advisory Opinion

It is the opinion of the ASRT based on evidentiary documentation and where federal or state law and/or institutional policy permits that:

1. It is within the scope of practice for medical imaging and radiation therapy professionals to access and administer medications through new or existing vascular access by an approved method of administration (e.g., hand injection, power injection, slow push, bolus, infusion) as prescribed by a licensed practitioner

GRADE: Strong

## Definitions

- access – The process of inserting an approved connective device through the access point of an existing vascular access device to deliver intravenous (IV) fluids or medication.
- existing vascular access – Peripheral or central vascular implanted devices or external access lines that include, but are not limited to, peripherally inserted central catheter lines, intravenous lines, central lines and ports.

## Evidentiary Documentation

Current Literature


- ACR Committee on Drugs and Contrast Media. ACR Manual on Contrast Media. American College of Radiology; 2022.
- American College of Radiology. ACR-SPR practice parameter for performing and interpreting diagnostic computed tomography (CT). Revised 2022.
- American College of Radiology. ACR practice parameter for performing and interpreting magnetic resonance imaging (MRI). Revised 2022.
- American College of Radiology. ACR-SPR practice parameter for the use of intravascular contrast media. Revised 2022.
- Rockwell D. A competency for central line use in radiology. J Radiol Nurs 2008;27(2):84. doi:10.1016/j.jradnu.2008.04.016


QUALITY OF EVIDENCE: High

Curricula

- Cardiac-Interventional and Vascular-Interventional Curriculum (ASRT, 2019)
- Computed Tomography Curriculum (ASRT, 2018)
- Magnetic Resonance Curriculum (ASRT, 2020)
- Mammography Curriculum (ASRT, 2018)
- National Education Curriculum for Sonography (JRCDMS, 2016)

* Excludes limited x-ray machine operator

† Excludes medical dosimetry

- x Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2022)
- x Radiation Therapy Curriculum (ASRT, 2019)
- x Radiography Curriculum (ASRT, 2022)
- x Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications

- x Components of Preparedness (NMTCB, 2020)
- x Computed Tomography (ARRT, 2022)
- x Examination Overview: Registered Cardiovascular Invasive Specialist (CCI, 2022)
- x Magnetic Resonance Imaging (ARRT, 2020)
- x Nuclear Medicine Technology (ARRT, 2022)
- x Positron Emission Tomography ( PET) Specialty Examination Content Outline NMTCB, 2021
- x Radiography (ARRT, 2022)
- x Registered Radiologist Assistant (ARRT, 2023)
- x Vascular-Interventional Radiography (ARRT, 2017)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- x Scope of Practice
  - o Administering medications enterally, parenterally, through new or existing vascular access or through other routes as prescribed by a licensed practitioner.*†
  - o Identifying, calculating, compounding, preparing and/or administering medications as prescribed by a licensed practitioner.*†

* Excludes limited x-ray machine operator
† Excludes medical dosimetry

# Placement of Personnel Radiation Monitoring Devices

After research of evidentiary documentation, the ASRT issued opinions contained herein.

## Advisory Opinion

It is the opinion of the ASRT based on evidentiary documentation and where federal or state law and/or institutional policy permits that:

1. Radiation workers wear a personnel radiation monitoring device outside of protective apparel with the label facing the radiation source at the level of the collar.
2. In specific cases, a whole body monitor may be indicated. This monitor should be worn at the waist inside of protective apparel, with the label facing the radiation source.
3. In some cases, a ring monitor may be indicated. This monitor should be worn on the hand likely to receive the highest exposure, with the label facing the radiation source.

GRADE: Strong

## Definitions

See glossary.

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications

- Cardiac-Interventional Radiography (ARRT, 2017)
- Components of Preparedness (NMTCB, 2020)
- Limited Scope of Practice in Radiography (ARRT, 2023)
- Nuclear Medicine Technology (ARRT, 2022)
- Radiation Therapy (ARRT, 2022)
- Radiography (ARRT, 2022)
- Registered Radiologist Assistant (ARRT, 2023)
- Vascular-Interventional Radiography (ARRT, 2017)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- When appropriate, uses personnel radiation monitoring devices(s) as indicated by the RSO or designee, (Standard Four, General Criteria)

Federal and State Statute References

- § 19.12 Instruction to Workers (NRC, 2021)
- § 20.1208 Dose Equivalent to an Embryo/Fetus (NRC, 2021)
- § 20.1502 Conditions Requiring Individual Monitoring of External and Internal Occupational Dose (NRC, 2021)
- Regulatory Guide 8.34: Monitoring Criteria and Methods to Calculate Occupational Radiation Doses (NRC, 2022)
- Regulatory Guide 8.36: Radiation Dose to the Embryo/Fetus (NRC, 2017)
- Regulatory Guide 8.7: Instructions for Recording and Reporting Occupational Radiation Exposure Data (NRC, 2018)

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# Use of Postexposure Shuttering, Cropping and Electronic Masking in Radiography

After research of evidentiary documentation, the ASRT issued opinions contained herein.

## Advisory Opinion

It is the opinion of the ASRT based on evidentiary documentation and where federal or state law and/or institutional policy permits that:

1. It is within the scope of practice of a radiologic technologist to determine and apply appropriate pre-exposure collimation to individual projections of examinations to comply with the principle of ALARA. Postexposure shuttering, cropping, electronic collimation or electronic masking to eliminate the visibility of large regions of brightness are acceptable, where automatic processing fails to do so.
2. It is outside of the scope of practice of a radiologic technologist to use postexposure shuttering, cropping, electronic collimation or electronic masking to eliminate any anatomical information. This information is a part of the patient's permanent medical record and should therefore be presented to the licensed practitioner to determine whether the exposed anatomy obtained on any image is significant or of diagnostic value.
3. It is outside the scope of practice of a radiologic technologist to use postexposure shuttering, cropping, electronic collimation or electronic masking to duplicate and use any acquired image for more than one prescribed view or projection on any exam. Facilities acquiring digital images are legally required to retain information in the DICOM information of each image that identifies the selected view or projection at the time of image acquisition. Using the same acquired image to r

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- Willis CE. Optimizing digital radiography of children. Eur J Radiol. 2009;72(2):266–273. doi:10.1016/j.ejrad.2009.03.003
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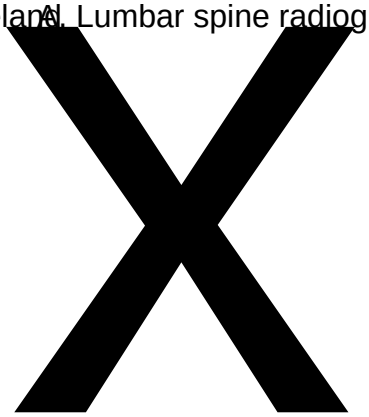

Effective June 25, 2023

clinically competent – The ability to perform a clinical procedure in a manner that satisfies the demands of a situation, as assessed and documented by a qualified individual.

compounding medication – The combining, mixing, pooling or otherwise altering of a conventionally manufactured drug in response to or anticipation of a medication order.

compounding radiopharmaceutical – The combining, mixing, pooling or otherwise altering of a conventionally manufactured radiopharmaceutical or synthesizing/formulating a radiopharmaceutical from bulk drug substances and radionuclides.

contrast media – A substance administered during a medical imaging procedure for the purpose of enhancing the contrast between an internal structure or fluid and the surrounding tissue.

cropping – The process of selecting and removing a portion of the image.

custom blocks – Devices designed to shape the radiation field.

DICOM – Acronym for “Digital Imaging and Communications in Medicine.” The DICOM standards are a complex set of instructions to exchange and present medical image information.

dose distribution – Spatial representation of the magnitude of the dose produced by a source of

Effective June 25, 2023

monitor units – Unit of output measure used for linear accelerators, sometimes indicated with the abbreviation MU. Accelerators are calibrated so that 1 MU delivers 1 cGy for a standard reference field size at a standard reference depth at a standard source to calibration point.

MQSA – Mammography Quality Standards Act

MR Level 2 Personnel – Individuals who have completed more extensive education in broad MR safety issues related to all MR energy fields.

NECS – National Education Curriculum for Sonography

NMTCB – Nuclear Medicine Technology Certification Board

noninterpretive fluoroscopic procedures – Use of fluoroscopic imaging under the direction of a licensed practitioner for purposes other than interpretation.

normal tissue tolerance – Radiation tolerance levels of healthy organs near or within the radiationtreatment fields.

NRC – U.S. Nuclear Regulatory Commission

panning – Movement of the procedure table during image production to maintain visualization of an anatomic region of interest.

personnel radiation monitoring devices – Devices designed to be worn or carried by an individual for the purpose of measuring the dose of radiation received.

physics survey – Performing equipment testing, evaluating the testing results and completing a formal written report of results. The written survey report, validat P i

radiation oncologist – A physician who specializes in using radiation to treat cancer.

radiation protection – Prophylaxis against injury from ionizing radiation. The only effective preventive measures are shielding the operator, handlers and patients from the radiation source; maintaining appropriate distance from the source; and limiting the time and amount of exposure.

radioactive material – A substance composed of unstable atoms that decay with the spontaneous emission of radioactivity. Includes radiopharmaceuticals, unsealed sources (open, frequently in liquid or gaseous form) and sealed sources (permanently encapsulated, frequently in solid form).

radiobiology – The study of the effects of radiation on living organisms.

radiography – The process of obtaining an image for diagnostic examination using x-rays.

treatment field (portal) – Volume of tissue exposed to radiation from a single radiation beam.

treatment planning – The process by which dose delivery is optimized for a given patient and clinical situation. It encompasses procedures involved in planning a course of radiation treatment, including simulation through completion of the treatment summary.

treatment record – Documents the delivery of treatments, recording of fractional and cumulative doses, machine settings, verification imaging and the ordering and implementation of prescribed changes.

T-score – Number of standard deviations the individual's bone mineral density is from the average bone mineral density for gender-matched young normal peak bone mass.

USP – United States Pharmacopeia

vascular access device – Apparatus inserted into the peripheral or central vasculature for diagnostic or therapeutic purposes

vascular closure device – $ F W L Y H  R U  S D V V L Y H  P H G L F D O  G H Y L F H V  X V H cardiovascular or endovascular procedure that requires catheterization.

venipuncture – The transcutaneous puncture of a vein by a sharp rigid stylet or cannula carrying a flexible plastic catheter or by a steel needle attached to a syringe or catheter.

verification images – Images produced to confirm accurate treatment positioning and accurate treatment portals.

Z-score – Number of standard deviations the individual's bone mineral density is from the average bone mineral density for age- and gender-matched reference group.