The ASRT Practice Standards for Medical Imaging and Radiation Therapy

Preface

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

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

The medical imaging and radiation therapy professional and any individual who is legally authorized to perform medical imaging or radiation therapy procedures 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. 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 six sections:

- *Definition* – defines the practice of medical imaging and radiation therapy professionals.
- *Education and Certification* – describes 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* – define the expectations and activities of the individual responsible for the care of patients and delivery of medical imaging and radiation therapy procedures. The standards are numbered with a term or set of terms that describes the standards. They include a statement of the expected performance of the individual when performing the procedure or treatment and rationale explaining why an individual should adhere to the standard. Each standard is divided into two parts: the general criteria and the specific criteria. Both general and specific criteria should be used when evaluating performance.
    - *General Criteria* – apply to all medical imaging and radiation therapy professionals.
    - *Specific Criteria* – apply to medical imaging and radiation therapy professionals in each discipline.

- *Advisory Opinion Statements* – provide explanations of the Practice Standards and are intended for clarification and guidance for specific practice issues.
- *Glossary* – defines terms and abbreviations used throughout the Practice Standards.

Definition

Introduction

The medical imaging and radiation therapy profession comprises health care professionals identified as bone densitometry technologists, cardiac interventional and vascular interventional technologists, computed tomography technologists, limited x-ray machine operators, magnetic resonance technologists, mammographers, medical dosimetrists, nuclear medicine technologists, quality management technologists, radiation therapists, radiographers, radiologist assistants or sonographers who are educationally prepared and clinically competent as identified by these standards.

Furthermore, these standards apply to health care employees who are legally authorized to perform medical imaging or radiation therapy and who are educationally prepared and clinically competent as identified by these standards.

Medical imaging and radiation therapy professionals are vital members of a multidisciplinary team composed of highly trained health care professionals, each bringing their expertise to patient care. They play a critical role in the delivery of health services as new modalities emerge and the need for medical imaging and radiation therapy procedures increases.

Medical imaging and radiation therapy integrates scientific knowledge, technical competence and patient interaction skills to provide safe and accurate procedures with the highest regard to all aspects of patient care. Medical imaging and radiation therapy professionals recognize elements unique to each patient, which is essential for the successful completion of procedures.

Medical imaging and radiation therapy professionals are the primary liaison between patients, licensed practitioners and other members of the health care team. These professionals must remain sensitive to the needs of the patient through communication, assessment, monitoring and patient care. Medical imaging and radiation therapy professionals effectively employ advanced technologies and software, including artificial intelligence and machine learning, to enhance diagnostic accuracy and improve patient outcomes. As members of the health care team, medical imaging and radiation therapy professionals participate in quality improvement processes and continually assess their professional performance.

Medical imaging and radiation therapy professionals think critically and use independent, professional and ethical judgment in all aspects of their work. They engage in continuing education, which includes their area of practice to enhance patient care, safety, public education, knowledge and technical competence.

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,

continuous patient monitoring and advanced patient care skills.

Radiologist assistants maintain their radiographer credentials; therefore, both the radiologist assistant and radiography sections of the Practice Standards should be consulted when seeking practice information for the radiologist assistant. The clinical activities are delegated by the supervising radiologist in accordance with statutes, regulations, accreditation standards and institutional policies.

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. Individuals working in more than one discipline must meet these requirements in the specific disciplines they are responsible for performing.

Medical imaging and radiation therapy professionals should be registered by certification agencies recognized by the ASRT. Individuals performing diagnostic or therapeutic procedures in more than one discipline will adhere to the general and specific criteria for each discipline.

To maintain certification, medical imaging and radiation therapy professionals must complete appropriate continuing education requirements to sustain their expertise and awareness of changes and advances in practice.

Medical imaging and radiation therapy professionals performing multimodality hybrid procedures should meet certification requirements for the diagnostic or therapeutic portion of the procedure and must be educationally prepared and clinically competent in the specific discipline for which they perform attenuation correction or anatomical localization.

Medical imaging and radiation therapy professionals performing multimodality hybrid procedures should be registered by certification agencies recognized by the ASRT in the discipline for the diagnostic or therapeutic portion of the procedure. Individuals performing multimodality hybrid procedures will adhere to the specific criteria for the diagnostic or therapeutic portion of the procedure.

Medical imaging and radiation therapy professionals performing multimodality hybrid procedures should complete continuing education requirements in the discipline used for the diagnostic or therapeutic portion of the procedure and maintain education and clinical competence in the discipline used for attenuation correction or anatomical localization.

Radiologist Assistant

Only radiographers who have completed the appropriate education and obtained certification as outlined in these standards should perform radiologist assistant procedures.

Radiologist assistants prepare for their roles on the interdisciplinary team by meeting examination eligibility criteria as determined by the ARRT.

Technologists who have passed the registered radiologist assistant examination use the additional credential R.R.A.

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 medical imaging and radiation therapy professionals 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, their clinical activities may evolve.

The scope of practice of medical imaging and radiation therapy professionals 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.*†
- Administering oxygen as prescribed by a licensed practitioner.
- Applying, implementing and monitoring AI.
- 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 adhering to HIPAA and established policies.
- 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 or administering medications as prescribed by a licensed practitioner.*†
- Maintaining professionalism in patient care.
- Performing ongoing quality assurance activities.
- Performing point-of-care testing as prescribed by a licensed practitioner.†
- Performing venipuncture as prescribed by a licensed practitioner.*†
- Postprocessing data.
- Preparing patients for procedures.
- Providing education.
- Providing input for equipment or 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 or removing intravenous access as prescribed by a licensed practitioner.*†
- Using vein localization devices for placement of intravenous catheters when appropriate. *†
- Verifying archival storage of data.
- Verifying informed consent for applicable procedures.*

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

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 preprocedural evaluation as part of the radiologist-led team.
- Obtaining images necessary for diagnosis and communicating initial observations to the supervising radiologist. The radiologist assistant does not provide image interpretation as defined by the ACR.
- Participating in or obtaining informed consent.
- Participating in quality assurance activities within the radiology practice.
- Performing or assisting with invasive or noninvasive procedures as delegated by the radiologist who is licensed to practice and has privileges for the procedure being performed by the radiologist assistant.
- Providing follow-up patient evaluation.

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 the patient, equipment, procedure and 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 or factors that may affect the procedure.
- Assesses patient lab values, medication list and risk for allergic reaction 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.
- Recognizes signs and symptoms of an emergency.
- Verifies appropriateness of the requested or prescribed procedure, in compliance with the clinical indication and protocol.
- Verifies parameters when using AI to ensure patient safety in accordance with ALARA principles.
- 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.

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

Specific Criteria

Radiologist Assistant

- Assesses the patient's level of anxiety and pain and informs the supervising radiologist.
- Interviews the 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.

Standard Two – Analysis and Determination

The medical imaging and radiation therapy professional analyzes the information obtained during the assessment phase and develops an action plan for completing the procedure.

Rationale

Determining the most appropriate action plan enhances patient safety and comfort, optimizes diagnostic and therapeutic quality and improves efficiency.

The medical imaging and radiation therapy professional:

General Criteria

- Analyzes relevant evidence-based practice to inform clinical decision-making.*

- Consults appropriate medical personnel to determine an action plan.
- Determines that all procedural requirements are in place to achieve a quality procedure.
- Determines the appropriate type and dose of contrast media to be administered based on established protocols.*†
- Determines the course of action for an emergent situation.
- Determines the need for and selects supplies, accessory equipment, shielding, positioning and immobilization devices.
- Develops methods for minimizing hazards associated with medical imaging and radiation therapy procedures.
- Employs professional judgment to adapt procedures to improve diagnostic quality or therapeutic outcomes.
- Evaluates and monitors services, procedures, equipment and the environment to determine if they meet or exceed established guidelines and develops the action plan.
- Monitors and develops methods to improve customer satisfaction.
- Selects the most appropriate and efficient action plan after reviewing all pertinent data and assessing the patient's abilities and condition.

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

Specific Criteria

Radiologist Assistant

- Reviews the patient's medical record and the licensed practitioner's request to determine optimal imaging procedure for clinical indications.

Standard Three – Education, Collaboration and Collegiality

The medical imaging and radiation therapy professional promotes a positive, collaborative and collegial atmosphere by providing information to the patient, public and other health care providers about procedures and related health issues.

Rationale

All individuals must communicate effectively and work together efficiently to provide quality patient care. Education and a collaborative work environment are necessary to establish positive relationships, promote safe practices and provide quality patient care.

The medical imaging and radiation therapy professional:

General Criteria

- Develops and maintains collaborative partnerships to enhance quality and efficiency.
- Educates the patient, public and other health care providers about procedures, the associated biological effects and radiation protection.
- Elicits confidence and cooperation from the patient, the public and other health care providers by providing timely communication and effective instruction.
- Explains effects and potential side effects of medications.*†
- Promotes awareness and understanding to patients, health care providers, students and the public concerning the profession.
- Provides accurate explanations and instructions at an appropriate time and at a level the patient and their care providers can understand and addresses questions and concerns

regarding the procedure.
- Provides information about the role of AI.
- Provides information on certification or accreditation to the patient, other health care providers and the public.
- Provides pre-, peri- and post-procedure education.
- Refers questions about diagnosis, treatment or prognosis to a licensed practitioner.
- Shares knowledge and expertise with others.

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

Specific Criteria

Radiologist Assistant

- Provides precare and postcare instructions to the patient as part of the radiologist-led team.

Standard Four – Performance

The medical imaging and radiation therapy professional performs the action plan and quality assurance activities, including modifications when needed.

Rationale

Quality patient services are provided through the safe and accurate performance of a deliberate plan of action. Quality assurance activities provide valid and reliable information regarding the performance of equipment, materials and processes.

The medical imaging and radiation therapy professional:

General Criteria

- Adheres to radiation safety rules and standards.
- Administers contrast media and other medications only when a licensed practitioner or radiologist assistant is physically present to ensure proper diagnosis and treatment of adverse events.*†
- Administers first aid or provides life support.†
- Applies principles of aseptic or sterile technique.
- Assesses and monitors the patient's physical, emotional and mental status.
- Complies with infection control protocols.
- Consults with medical physicist or engineer in performing and documenting quality control tests and in reviewing of quality assurance.
- Explains to the patient each step of the action plan as it occurs and elicits the cooperation of the patient.
- Immobilizes patient for procedure.
- Implements an action plan.
- Maintains current information on equipment, materials and processes.
- Modifies the action plan according to changes in the clinical situation, equipment or environment.
- Monitors the patient for reactions to medications.*†
- Participates in ALARA, patient and personnel safety and risk management activities.
- Performs ongoing quality assurance activities and quality control testing.
- Performs procedural timeout.

- Positions patient for anatomic area of interest, respecting patient ability and comfort.
- Supports and implements the safe use of new technologies and procedures.
- Uses accessory equipment.
- Uses an integrated team approach.
- Uses knowledge to modify current practices.
- Uses personnel radiation monitoring devices as indicated by the RSO or designee.
- Works aseptically in the appropriate environment while preparing, compounding and dispensing sterile and nonsterile medication.*†

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

Specific Criteria

Radiologist Assistant

- Administers medications as approved by the supervising radiologist.
- Administers minimal and moderate sedation as prescribed by the supervising radiologist.
- Collects and documents tissue and fluid specimens.
- Demonstrates safe handling and disposal of radioactive materials.
- Maintains security of radioactive material to reduce radiation exposure to patients, personnel and general public.
- Monitors the patient's physical condition during the procedure and responds to changes in the patient's vital signs, hemodynamics and level of consciousness.
- Participates in quality reporting measures for the purpose of improved patient care.
- Recognizes and responds to medical emergencies, activates emergency response systems and provides advanced life support intervention.
- Uses radiation detecting equipment.
- Uses radiation shielding devices when handling radiopharmaceuticals.

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 customer satisfaction.
- Evaluates discrepancies and variances when using AI.
- Evaluates images for optimal demonstration of anatomy of interest.

- Evaluates images to determine the use of appropriate imaging parameters.
- Evaluates quality assurance and quality control 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

Radiologist Assistant

Refer to general criteria.

Standard Six – Implementation

The medical imaging and radiation therapy professional implements the revised action plan based on quality assurance results and achievement of goals from the action plan.

Rationale

It may be necessary to implement a revised action plan to promote safe and effective services.

The medical imaging and radiation therapy professional:

General Criteria

- Adjusts imaging parameters, patient procedure or additional factors to improve the outcome.
- Bases the revised plan on the patient's condition and the most appropriate means of achieving the expected outcome.
- Implements appropriate health care provider notification when immediate clinical response is necessary, based on procedural findings and patient condition.
- Implements the revised action plan.
- Monitors patient vital signs pre-, peri- and post-procedure. *†.
- Obtains assistance to support the quality assurance action plan.
- Resolves discrepancies and variances associated with AI use.
- Takes action based on patient and procedural variances.

Specific Criteria

Radiologist Assistant

- Manages radioactive contamination and uses decontamination procedures.

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 actual outcome is compared to 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 appropriate action plan.
- Performs procedural analysis.
- Reviews and analyzes all data for completeness and accuracy.
- Reviews and evaluates quality assurance processes and tools for effectiveness.
- Reviews the implementation process for accuracy and validity.
- Uses evidence-based practice to determine whether the actual outcome is within established criteria.

Specific Criteria

Radiologist Assistant

- Performs follow-up patient evaluation and communicates findings to the supervising radiologist.

Standard Eight – Documentation

The medical imaging and radiation therapy professional documents information regarding 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 and any adverse effects in the 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 individual involved in the patient's care.
- Records information used for billing and coding procedures.
- Reports any out-of-tolerance deviations to the appropriate personnel.
- Verifies patient consent is documented.

†Excludes limited x-ray machine operator

*Excludes medical dosimetry

Specific Criteria

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.

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.
- Applies professional judgment and discretion while performing the procedure.
- Assists with establishing required quality assurance and quality control criteria.
- Establishes the parameters of AI and develops quality assurance activities.
- Maintains ALARA principles while utilizing integrated AI technology.
- Participates in ongoing quality assurance programs.

Specific Criteria

Radiologist Assistant

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

Standard Ten – Self-Assessment and Professional Development

The medical imaging and radiation therapy professional evaluates personal performance and maintains professional growth.

Rationale

Self-assessment is necessary for personal growth and professional development. This can direct education necessary to maintain current knowledge and advancements in the profession to provide optimal patient care.

The medical imaging and radiation therapy professional:

General Criteria

- Advocates for and participates in continuing education related to area of practice to maintain and enhance clinical competency.
- Advocates for and participates in vendor-specific applications training to maintain clinical competency.
- Assesses personal work ethics, behaviors and attitudes.
- Evaluates performance, applies personal strengths and recognizes opportunities for educational growth and improvement.
- Maintains credentials and certification related to practice.
- Maintains knowledge of the most current practices and technology used to optimize patient exposure while producing quality images.
- Recognizes hazards associated with their work environment and takes measures to mitigate them.

Specific Criteria

Radiologist Assistant

Refer to general criteria.

Standard Eleven – 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

- Advocates for and participates in continuing education related to area of practice to maintain and enhance clinical competency.
- Advocates for and participates in vendor-specific applications training to maintain clinical competency.
- Assesses personal work ethics, behaviors and attitudes.
- Evaluates performance, applies personal strengths and recognizes opportunities for educational growth and improvement.
- Maintains credentials and certification related to practice.
- Maintains knowledge of the most current practices and technology used to optimize patient exposure while producing quality images.
- Recognizes hazards associated with their work environment and takes measures to mitigate them.

Specific Criteria

Radiologist Assistant

Refer to general criteria.

Standard Twelve – Research, Innovation and Professional Advocacy

The medical imaging and radiation therapy professional participates in the acquisition and dissemination of knowledge, advocacy 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.
- Improves patient care and clinical outcomes through integration and dissemination of evidence-based research and practice.
- Investigates innovative methods for application in practice.
- Investigates relevant AI uses to enhance the science of the profession.
- Monitors changes to statutes, regulations, accreditation standards and institutional policies.
- Participates in data collection.
- Participates in professional advocacy efforts.
- Participates in professional societies and organizations.
- Pursues lifelong learning.
- Reads and evaluates research relevant to the profession.
- Shares information through publication, presentation and collaboration.

Specific Criteria

Radiologist Assistant

Refer to general criteria.

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 taken in the course of providing those services. The advisory opinion statements assist medical imaging and radiation therapy professionals in safe practice.

The medical imaging and radiation therapy professional's performance should be evidence-based and consistent with statutes, regulations, accreditation standards and institutional policies.

The ASRT recognizes the use of GRADE for measuring the quality of evidence and strength in recommendations for the development of advisory opinion statements.

Medical imaging and radiation therapy professionals must exercise prudent judgment when determining whether performing a given act is based on their educational preparation and clinical competence, within their scope of practice, and, if applicable, within their license in the jurisdiction where they are employed.

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 statutes, regulations, accreditation standards and institutional policies permit 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 be free-flowing, consistent and relevant to the patient examination or procedure. This communication can take many forms, including verbal, written and electronic correspondence. These communications may be included and taken into consideration by the radiologist in creating a final report. However, initial clinical and imaging observations and procedure details communicated from the radiologist assistant to the radiologist are only intended for the radiologist's use and do not substitute for the final report created by the radiologist. These communications should be considered and documented as "initial clinical and imaging observations or procedure details."
2. While assisting radiologists in the performance of imaging procedures or during the performance of procedures under radiologist supervision, the radiologist assistant must be able to communicate and document procedure notes, observations, patient responses and other types of information relevant to the radiologist's interpretation and creation of the final report. Radiologist assistants do not independently "report findings" or "interpret" by dictation or by any other means; and to avoid any confusion, these terms should not be used to refer to the activities of the radiologist assistant. However, radiologist assistants may add to the patient record (following the policies and procedures of the facility) in a manner similar to any other dependent nonphysician practitioner. Radiologist assistants who are authorized to communicate initial observations to the supervising radiologist using a voice recognition dictation system or other electronic means must adhere to institutional protocols ensuring that initial observations can be viewed or accessed only by the supervising radiologist. Initial clinical or imaging observations or procedure details created by the radiologist assistant resulting from the radiologist assistant's involvement in the performance of the procedure that are included in the final report should be carefully reviewed by the supervising radiologist and should be incorporated at the supervising radiologist's discretion.

GRADE: Strong

Definitions

See glossary.

Evidentiary Documentation

Current Literature

Not applicable

Curricula

- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Entry-Level Clinical Activities

- Registered Radiologist Assistant Entry-Level Clinical Activities (ARRT, 2023)

  The document states that radiologist assistants may "Review imaging procedures, make initial observations, and communicate observations **ONLY** [emphasis added] to the radiologist; record initial observations of imaging procedures following radiologist approval; communicate radiologist's report to appropriate health care provider consistent with the ACR Practice Parameter for Communication of Diagnostic Imaging Findings."

Certification Agency Content Specifications

Not applicable

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- Scope of Practice (radiologist assistant only)
  - Communicating the supervising radiologist's report to the appropriate health care provider consistent with the ACR Practice Guidelines for Communication of Diagnostic Imaging Findings.
  - Evaluating images for completeness and diagnostic quality and recommending additional images.
  - Obtaining images necessary for diagnosis and communicating initial observations to the supervising radiologist. The radiologist assistant does not provide image interpretation as defined by the ACR.
  - Providing follow-up patient evaluation.

- The ASRT Practice Standards for Medical Imaging and Radiation Therapy
  - Performs a history and physical examination, analyzes data, and reports findings as part of a radiologist-led team to the supervising radiologist. (Standard One, radiologist assistant only)
  - Performs follow-up patient evaluation and communicates findings to the supervising radiologist. (Standard Seven, radiologist assistant only)
  - Documents diagnostic, treatment and patient data in the medical record in a timely, accurate and comprehensive manner. (Standard Eight, General Criteria)
  - Maintains documentation of quality assurance activities, procedures and results. (Standard Eight, General Criteria)

- Communicates and documents a radiologist's order to other health care providers. (Standard Eight, radiologist assistant only)
- 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 procedure details to the supervising radiologist. (Standard Eight, radiologist assistant only)

QUALITY OF EVIDENCE: High

Statute and Regulation References
Not applicable

Other
Not applicable

Medication Administration in Peripherally Inserted Central Catheter Lines or Ports With a Power Injector*†

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

Advisory Opinion

It is the opinion of the ASRT based on evidentiary documentation and where statutes, regulations, accreditation standards and institutional policies permit that:

Medical imaging and radiation therapy professionals can access or use an FDA approved:

1. Peripherally inserted central catheter (PICC) line by inserting an approved connective device. The PICC line must be designated for use with power injectors. Manufacturer guidelines regarding infusion rate and pressure must be followed.
2. Port by inserting an approved non coring needle. The port must be designated for use with power injectors. Manufacturer guidelines regarding infusion rate and pressure must be followed.

GRADE: Strong

Definitions

See glossary.

Evidentiary Documentation

Current Literature
Not applicable

Curricula

- Computed Tomography Curriculum (ASRT, 2023)
- Magnetic Resonance Curriculum (ASRT, 2020)
- Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2022)
- Radiography Curriculum (ASRT, 2022)
- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications

- Components of Preparedness (NMTCB, 2024)
- Computed Tomography (ARRT, 2022)
- Positron Emission Tomography (PET) Specialty Examination Content Outline (NMTCB, 2023)
- Vascular Interventional Radiography (ARRT, 2023)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- Scope of Practice
    - 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.*†
    - Identifying, calculating, compounding, preparing or administering medications as prescribed by a licensed practitioner.*†

QUALITY OF EVIDENCE: High

Statute and Regulation 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 statutes, regulations, accreditation standards and institutional policies permit 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; 2024.
- 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, 2024)
- Computed Tomography Curriculum (ASRT, 2023)
- Magnetic Resonance Curriculum (ASRT, 2020)
- Mammography Curriculum (ASRT, Revised 2023)
- National Education Curriculum for Sonography (JRC-DMS, 2024)
- Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2022)
- Radiation Therapy Curriculum (ASRT, 2024)
- Radiography Curriculum (ASRT, 2022)
- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications

- Components of Preparedness (NMTCB, 2024)
- Computed Tomography (ARRT, 2022)
- Examination Overview: Registered Cardiovascular Invasive Specialist (CCI, 2022)
- Magnetic Resonance Imaging (ARRT, 2020)
- Nuclear Medicine Technology (ARRT, 2022)
  Positron Emission Tomography (PET) Specialty Examination Content Outline (NMTCB, 2023)

- Radiography (ARRT, 2022)
- Registered Radiologist Assistant (ARRT, 2023)
- Vascular-Interventional Radiography (ARRT, 2023)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- Scope of Practice
  - Administering medications enterally, parenterally, through new or existing vascular access or through other routes as prescribed by a licensed practitioner.*†
  - Identifying, calculating, compounding, preparing or administering medications as prescribed by a licensed practitioner.*†
  - Performing venipuncture as prescribed by a licensed practitioner.*†
  - Starting, maintaining or removing intravenous access as prescribed by a licensed practitioner.*†

QUALITY OF EVIDENCE: High

Statute and Regulation References

Not Applicable

Other

Not Applicable

*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 statutes, regulations, accreditation standards and institutional policies permit 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.

Evidentiary Documentation

Current Literature

- Bushong S. Occupational radiation dose management. In: *Radiologic Science for Technologists: Physics, Biology, and Protection.* 12th ed. Elsevier; 2020: 547 - 549.
- By standards number: 1910.1096(d)(3)(i) – ionizing radiation. Occupational Safety and Health Administration website.
- Gilmore D, Watersham-Rich K. Radiation safety in nuclear medicine. In: *Nuclear Medicine and PET/CT: Technology and Technique.* 8th edition. Elsevier; 2016:116.
- Statkiewicz-Sherer MA, Visconti PJ, Ritenour ER, Welch-Haynes K. Radiation monitoring. In: *Radiation Protection in Medical Radiography.* 9th ed. Elsevier; 2022:72- 87.

QUALITY OF EVIDENCE: High

Curricula

- Bone Densitometry Curriculum (ASRT, Revised 2023)
- Limited X-ray Machine Operator Curriculum (ASRT, 2020)
- Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2022)
- Radiation Therapy Curriculum (ASRT, 2024)
- Radiography Curriculum (ASRT, 2022)

- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications

- Cardiac Interventional Radiography (ARRT, 2023)
- Components of Preparedness (NMTCB, 2024)
- 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, 2023)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- Uses personnel radiation monitoring devices as indicated by the RSO or designee, (Standard Four, General Criteria)

Statute and Regulation 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)

QUALITY OF EVIDENCE: High

Other

- AAPM Report No. 58: Managing the Use of Fluoroscopy in Medical Institutions. Appendix A: Radiation Safety/Quality Assurance Program

QUALITY OF EVIDENCE: High

Supervision of Contrast Media Administration by Radiologist Assistants

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

Advisory Opinion

It is the opinion of the ASRT based on evidentiary documentation and where statutes, regulations, accreditation standards and institutional policies permit that radiologist assistants are qualified to:

1. Supervise the administration of contrast media for medical imaging and radiation therapy procedures, as members of the radiologist-led team. The radiologist assistant must be able to consult with their supervising physician.

2. Recognize and respond to medical emergencies resulting from the administration of contrast media, in accordance with their advanced cardiac life support certification.
3. Administer medications and other interventions under a standing orders or algorithmic approach, as outlined by the American College of Radiology Manual of Contrast Media.

GRADE: Strong

Definitions

See glossary.

Evidentiary Documentation

Current Literature

- ACR Committee on Drugs and Contrast Media. ACR Manual on Contrast Media. American College of Radiology; 2024.
- American College of Radiology. Statement from Drugs and Contrast Media Committee on Supervision of Contrast Material Administration. Accessed February 26, 2024. https://www.acr.org/-/media/ACR/Files/Clinical-Resources/FINAL_Statement-from-Drugs-and-Contrast-Media-Committee-on-Supervision-of-Contrast-Administration.pdf

Curricula

- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Entry-Level Clinical Activities

- Registered Radiologist Assistant Entry-Level Clinical Activities (ARRT, 2023)

The document states that radiologist assistants:

- Administer contrast agents and radiopharmaceuticals as prescribed by the supervising radiologist.
- Administer medications (EXCLUDING contrast agents and radiopharmaceuticals) as prescribed by a licensed practitioner and approved by the supervising radiologist.
- Administer oxygen as prescribed.
- Monitor patient for side effects or complications of the pharmaceutical(s).
- Perform examinations and procedures including contrast media administration when appropriate and operation of imaging equipment.
- Recognize and respond to medical emergencies (e.g., drug reactions, cardiac arrest, hypoglycemia) and activate emergency response systems, including notification of the supervising radiologist.

Certification Agency Content Specifications

- Registered Radiologist Assistant (ARRT, 2023)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference

- Scope of Practice (radiologist assistant only)
    - Completing patient history and physical.

- The ASRT Practice Standards for Medical Imaging and Radiation Therapy
    - Administers medications as approved by the supervising radiologist. (Standard Four, radiologist assistant only)
    - Monitors patient's physical condition during the procedure and responds to changes in patient vital signs, hemodynamics and level of consciousness. (Standard Four, radiologist assistant only)
    - Recognizes and responds to medical emergencies, activates emergency response systems and provides advanced life support intervention. (Standard Four, radiologist assistant only)
    - Documents administration of medications. (Standard Eight, radiologist assistant only)
    - Reports clinical and imaging observations and procedure details to the supervising radiologist. (Standard Eight, radiologist assistant only)

QUALITY OF EVIDENCE: High

Statute and Regulation References
Not applicable

Other
Not applicable

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 statutes, regulations, accreditation standards and institutional policies permit 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 represent two different prescribed views or projections is a falsification of the information in the patient medical record and imaging study made available to the licensed practitioner.

GRADE: Strong

Definitions

- **cropping –** The process of selecting and removing a portion of the image.
- **electronic masking –** Electronic collimation or cropping of the digital radiographic image that occurs during postprocessing of the acquired image and does not alter the size of the irradiated field.
- **shuttering –** A postprocessing technique that may be used to eliminate ambient light around an image for the sole purpose of improving the quality of the displayed image. It should not be used as a substitute for insufficient collimation of the irradiated field.

Evidentiary Documentation

Current Literature

- American College of Radiology. ACR-AAPM-SIIM-SPR practice parameter for digital radiography. Revised 2022.
- Bomer J, Wiersma-Deijl L, Holscher HC. Electronic collimation and radiation protection in paediatric digital radiography: revival of the silver lining. *Insights Imaging.* 2013;4(5):723-727. doi:10.1007/s13244-013-0281-5
- Carroll QB. *Radiography in the Digital Age.* 4th ed. Charles C Thomas; 2023.
- Carter C, Vealé B. *Digital Radiography and PACS.* 4th ed. Elsevier; 2023.
- Chalazonitis AN, Koumarianos D, Tzovara J, Chronopoulos P. How to optimize radiological images captured from digital cameras, using the Adobe Photoshop 6.0 program. *J Digit Imaging.* 2003;16(2):216-229.
- DeMaio DN, Herrmann T, Noble LB, et al; American Society of Radiologic Technologists. Best practices in digital radiography. Published 2019.
- Don S, Macdougall R, Strauss K, et al. Image Gently campaign back to basics initiative: ten steps to help manage radiation dose in pediatric digital radiography. *AJR Am J Roentgenol.* 2013;200(5):W431-W436. doi:10.2214/AJR.12.9895
- Fauber TL, Dempsey MC. X-ray field size and patient dosimetry. *Radiol Technol.* 2013;85(2):155-161.
- Fauber TL. *Radiographic Imaging and Exposure.* 6th ed. Elsevier; 2020:120 and 176.
- Goske MJ, Charkot E, Herrmann T, et al. Image Gently: challenges for radiologic technologists when performing digital radiography in children. *Pediatr Radiol.* 2011;41(5):611-619. doi:10.1007/s00247-010-1957-3
- Lo WY, Puchalski SM. Digital image processing. *Vet Radiol Ultrasound.* 2008;49(1 suppl 1):S42-S47. doi:10.1111/j.1740-8261.2007.00333.x
- Russell J, Burbridge BE, Duncan MD, Tynan J. Adult fingers visualized on neonatal intensive care unit chest radiographs: what you don't see. *Can Assoc Radiol J.* 2013;64(3):236-239. doi:10.1016/j.carj.2012.04.004
- Seeram E. *Digital Radiography: An Introduction.* Cengage Learning; 2011.
- Uffmann M, Schaefer-Prokop C. Digital radiography: the balance between image quality and required radiation dose. *Eur J Radiol.* 2009;72(2):202-208. doi:10.1016/j.ejrad.2009.05.060
- Willis CE. Optimizing digital radiography of children. *Eur J Radiol.* 2009;72(2):266-273. doi:10.1016/j.ejrad.2009.03.003
- Zetterberg LG, Espeland A. Lumbar spine radiography—poor collimation practices after implementation of digital technology. *Br J Radiol.* 2011;84(1002):566-9. doi:10.1259/bjr/74571469

QUALITY OF EVIDENCE: High

Curricula

- Limited X-ray Machine Operator Curriculum (ASRT, 2020)
- Radiography Curriculum (ASRT, 2022)

Certification Agency Content Specifications

- Limited Scope of Practice in Radiography (ARRT, 2023)
- Radiography (ARRT, 2022)

Scopes of Practice and Practice Standards Reference

- Scope of Practice
    - Applying principles of ALARA to minimize exposure to patient, self and others.
    - Selecting the appropriate protocol and optimizing technical factors while maximizing patient safety.

- The ASRT Practice Standards for Medical Imaging and Radiation Therapy
    - Employs professional judgment to adapt procedures to improve diagnostic quality or therapeutic outcomes. (Standard Two, General Criteria)
    - Adheres to radiation safety rules and standards. (Standard Four, General Criteria)
    - Participates in ALARA, patient and personnel safety and risk management activities (Standard Four, General Criteria)
    - Positions patient for anatomic area of interest, respecting patient ability and comfort. (Standard Four, General Criteria)
    - Uses pre-exposure collimation and proper field-of-view selection. (Standard Four, limited x-ray machine operator and radiography only)
    - Evaluates images for optimal demonstration of anatomy of interest. (Standard Five, General Criteria)
    - Evaluates images to determine the use of appropriate imaging parameters. (Standard Five, General Criteria)
    - Verifies that exposure indicator data for digital radiographic systems has not been altered or modified and is included in the DICOM header and on images exported to media. (Standard Five, limited x-ray machine operator and radiography only)
    - Adheres to the established practice standards of the profession. (Standard Eleven, General Criteria)

QUALITY OF EVIDENCE: High

Statute and Regulation References
Not applicable

Other
Not applicable

Glossary

The glossary is an alphabetical list of defined terms or words specifically found in the ASRT Practice Standards for Medical Imaging and Radiation Therapy. The terms or words have meaning that might not be general knowledge. The definitions are formulated using evidentiary documentation and put into place following extensive review and subsequent approval. The glossary is not all-inclusive. New terms and new usage of existing terms will emerge with time and advances in technology.

AAPM – American Association of Physicists in Medicine

ACR – American College of Radiology

adverse event – Any undesirable experience associated with the use of a medical product in a patient.

AI – artificial intelligence

ALARA – As Low As Reasonably Achievable. A principle related to making every reasonable effort to maintain exposures to radiation as far below the dose limits as practical, consistent with the purpose for which the licensed activity is undertaken. This is done while taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, in relation to the use of nuclear energy and licensed materials in the public interest and other societal and socioeconomic considerations. The ASRT recognizes the concept of ALARA to include energies used for magnetic resonance and sonographic imaging.

Anatomic landmarks – Bones or other identifiable points that are visible or palpable and indicate the position of internal anatomy.

appropriate action plan – Encompasses the initial, current or revised action plan.

archive (archival) – The storage of data in either hard (film) or soft (digital) form.

ARDMS – American Registry for Diagnostic Medical Sonography

ARRT – American Registry of Radiologic Technologists

ASRT – American Society of Radiologic Technologists

authorized user – A physician, dentist or podiatrist who meets the requirements as defined by the United States Nuclear Regulatory Commission.

beam-modification devices – Devices that change the shape of the treatment field or distribution of the radiation at (tissue) depth.

brachytherapy – A method of treatment that involves the temporary or permanent placement of radiation source (isotopic or electronic) inside or immediately adjacent to a tumor-bearing region.

CCI – Cardiovascular Credentialing International

clinical – Pertaining to or founded on actual observations and treatments of patients.

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.

DICOM – 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 radiation. It describes the variation of dose with position within an irradiated volume.

dose pooling – Combining unit doses of a radiopharmaceutical to meet the dosage requirements of a single patient.

dosimetric calculations – – Computation of treatment unit settings, monitor units, treatment times and radiation doses to anatomical areas of interest.

ECG – – electrocardiogram

educationally prepared – The successful completion of didactic and clinical education necessary to properly perform a procedure in accordance with accepted practice standards.

FDA – U.S. Food and Drug Administration

GRADE – Grading of Recommendations Assessment, Development and Evaluation

HIPAA – Health Insurance Portability and Accountability Act of 1996

HQCC – Healthcare Quality Certification Commission

hybrid imaging – – The combination of imaging technologies that allows information from different modalities to be presented as a single set of images.

image-guided radiation therapy – A process of using various imaging technologies to localize the target and critical tissues and, if needed, reposition the patient just before or during the delivery of radiotherapy.

imaging technologies – Technologies using ionizing and nonionizing radiation to visualize physiological processes, internal structures and fiducial markers, both anatomical and nonanatomical.

immediate use – Dose preparation, including one made using appropriate and necessary deviation, and/or the dispensing of a sterile radiopharmaceutical specific for a single patient.

immobilization device – Device that assists in maintaining or reproducing the position while limiting patient movement.

initial observation – Assessment of technical image quality with pathophysiology correlation communicated to a radiologist.

interpretation – The process of examining and analyzing all images within a given procedure and integration of the imaging data with appropriate clinical data in order to render an impression or conclusion set forth in a formal written report composed and signed by a licensed practitioner.

interventional procedures – – Invasive medical imaging guidance methods used to diagnose and/or treat certain conditions.

ISCD – International Society for Clinical Densitometry

JRC-DMS – Joint Review Committee on Education in Diagnostic Medical Sonography

least significant change – The least amount of bone mineral densitometry change that can be considered statistically significant.

licensed practitioner – A medical or osteopathic physician, chiropractor, podiatrist or dentist who has education and specialist training in the medical or dental use of radiation and is deemed competent to perform independently or supervise medical imaging or radiation therapy procedures by the respective state licensure board

MDCB – Medical Dosimetrist Certification Board

medical physicist – An individual who is competent to practice independently in the safe use of x-rays, gamma rays, electron and other charged particle beams, neutrons, radionuclides, sealed radionuclide sources, ultrasonic radiation, radiofrequency radiation and magnetic fields for diagnostic and therapeutic purposes. An individual is considered competent to practice in the field of medical physics if the individual is certified by the appropriate recognized certification organization.

medication – Any chemical substance intended for use in the medical diagnosis, cure, treatment or prevention of disease.

minimal sedation – A drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

moderate sedation – A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

molecular imaging – A noninvasive, diagnostic imaging technology that enables visualization, characterization and measurement of biologic processes at the molecular and cellular levels. Molecular imaging techniques may be applied to computed tomography, magnetic resonance, nuclear medicine, optical imaging, PET-CT, sonography and spectroscopy.

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.

MR Personnel – Individuals who have successfully completed education in MR safety at least to a level sufficient to ensure that they do not present a danger to themselves or others in the MR environment.

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 radiation treatment 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.

personal 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, validated by a medical physicist, contains sufficient information to document that each test was conducted according to local, federal or state requirements and includes an assessment of corrective actions and recommendations for improvements

point-of-care testing – Medical diagnostic testing performed outside the clinical laboratory in close proximity to where the patient is receiving care (e.g., blood sugars, creatinine).

postprocessing – Computerized processing of data sets after acquisition to create a diagnostic or therapeutic image.

procedure – Specific course of action intended to result in an imaging study, treatment or other outcome.

processing – Manipulation of the raw data just after acquisition.

protocol – The plan for carrying out a procedure, scientific study or a patient's treatment regimen.

quality assurance – Activities and programs designed to achieve a desired degree or grade of care in a defined medical, nursing or health care setting or program. Sometimes indicated with the abbreviation QA.

quality control – The routine performance of techniques used in monitoring or testing and maintenance of components of medical imaging and radiation therapy equipment. This includes the interpretation of data regarding equipment function and confirmation that corrective actions are/were taken. Sometimes indicated with the abbreviation QC.

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).

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

remote procedure – Operator control of image acquisition from a physical location that is different from the patient.

RSO – Radiation Safety Officer

scholarly activity – Activities that systematically advance the teaching, research and practice of the medical imaging and radiation therapy profession through scientific investigation, presentation, and publication.

setup – Arrangement of treatment parameters used in preparation for delivering radiation therapy; includes patient positioning data, field alignment information and equipment configurations.

simulation – A process using imaging technologies to plan radiation therapy so that the target area is precisely located and marked; the mockup procedure of a patient treatment with medical imaging documentation of the treatment portals.

SNMMI – Society of Nuclear Medicine and Molecular Imaging

static – Any medical image that is fixed or frozen in time.

superficial radiation therapy – Treatment with x-rays produced at potentials ranging from 40-150 kV.

supervising radiologist – A board-certified or board-eligible radiologist who oversees duties of the radiologist assistant and has appropriate clinical privileges for the procedure performed by the radiologist assistant.

theranostics – The systematic integration of molecularly targeted imaging and therapy that uses similar targeting molecules as a combination of imaging therapy.

timeout – Preprocedural pause to conduct a final assessment that the correct patient, site and procedure are identified.

tolerance levels – The maximum radiation dose that may be delivered to a given biological tissue at a specified dose rate and throughout a specified volume without producing an unacceptable change in the tissue.

treatment calculations – *See dosimetric calculations*.

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 – Active or passive medical devices used to achieve hemostasis after a 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.

Effective June 30, 2025