College of Nursing & Health Sciences

Department of Biomedical & Health Sciences

Radiation Therapy Program Student Handbook

Addendum to the College of Nursing and Health Sciences Handbook

Version 7

Document created: December 5, 2008
Updated: 1/13, 7/15, 8/17, 5/18, 8/19, 7/22

Table of Contents

General Program Information

Accreditation
The University of Vermont is accredited by the New England Commission of Higher Education (NECHE).

The Radiation Therapy program is accredited by The Joint Review Committee on Education in Radiologic Technology (JRCERT).

The program must abide by JRCERT Standards to maintain accreditation; if anyone has concerns that the program is not adhering to those Standards, please contact the Radiation Therapy Program Director or a University Official. If issues or concerns are not resolved, allegations may be submitted directly to the JRCERT.

JRCERT
20 N. Wacker Drive, Suite 2850
Chicago, IL 60606-3182.
Phone: (312)704-5300.
www.jrcert.org

University/Program Officials:
Suresh Garimella, PhD
Professor
President, University of Vermont

Noma Anderson, PhD
Professor
Dean, College of Nursing & Health Sciences

Eyal Amiel, PhD
Associate Professor
Chair, Department of Biomedical & Health Sciences

Wade Carson, MBA, RT(R)(T)(ARRT), FACHE
Clinical Associate Professor
Director, Radiation Therapy Program

Damian Bolduc, MSEL, RT(T)(ARRT)
Clinical Assistant Professor
Clinical Coordinator, Radiation Therapy Program

Thomas Kellogg, BS
Radiation Safety Officer, University of Vermont

Program Mission Statement

The mission of the University of Vermont's Radiation Therapy program is to educate, train, and graduate professionally competent and ethical individuals committed to lifelong learning and who are prepared to meet current and future workplace challenges in healthcare.

Advisory Committee

Clinical & Curriculum Advisory Committee (CCAC): meets annually in the fall. The committee is composed of the Program Director, Clinical Coordinator, and Clinical Preceptors, 3rd & 4th year radiation therapy students, and members at large. The Advisory Committee reviews clinical and didactic curriculum content, evaluates student success and outcomes, and suggests improvements or changes to the program. Additionally, the Committee reviews the program's American Registry of Radiologic Technologists exam pass rates and the Joint Review Commission on education in Radiologic Technology assessment plan in accordance with JRCERT standards.

Radiation Therapy Curriculum Committee

The committee is composed of faculty within the Department of Biomedical and Health Sciences who are well versed in the radiation therapy curriculum. The purpose of the committee is to discuss proposed curricular changes prior to departmental approval, review programmatic data annually, and discuss courses students are asking to count towards the major. The committee meets ad hoc except for the annual review of programmatic data.

Committee members:

Kenneth Allen, EdD, MBA
Senior Lecturer
Public Health Sciences Program

Eyal Amiel, PhD
Associate Professor
Medical Laboratory Science Program

Wade Carson, MBA, RT(R)(T)(ARRT), FACHE
Clinical Associate Professor
Radiation Therapy Program

Damian Bolduc, MSEL, RT(T)(ARRT)
Clinical Assistant Professor
Radiation Therapy Program

Program Effectiveness Data and Assessment Plan

The Radiation Therapy Program assessment plan will evaluate problem-solving and critical thinking skills, effective written and verbal communication skills, and achieve the highest professional and ethical standards. Within these goals, the assignment of program outcomes, measurement tools, benchmarks, time frames, are associated with each goal. Specific to the Radiation Therapy Program, effectiveness data are evaluated and reported yearly the Clinical & Curriculum Advisory Committee and the JRCERT as required to ensure program requirements are being met.

The radiation therapy program effectiveness data include:

1. ARRT exanimation pass rate for each cohort.
2. Job placement rate within six months of graduation.
3. Program completion rate.
4. Student learning outcomes:

<u>Goal one: Graduates will be clinically competent</u>

- Students will demonstrate patient care knowledge required to perform in a healthcare environment.
- Students will demonstrate the ability to retain & utilize both didactic & clinical Information

<u>Goal two: Students will exhibit problem solving and critical thinking skills</u>

- Students and graduates will demonstrate critical thinking skills
- Students and graduates will demonstrate problem solving skills.

<u>Goal three: Students will communicate clearly and effectively with faculty, patients, and clinical staff:</u>

- Students will demonstrate clear and effective communication with patients.
- Students will demonstrate clear and effective communication with faculty and staff.

Professional Behavior Policy

Professionalism is an attribute each student is expected to progressively develop as they become involved in the professional courses. It requires the student to develop specific behaviors consistent with the profession of Radiation Therapy. These behaviors are part of the objectives for the clinical practicum courses and will be considered as part of the grade evaluation for the course. The following objectives describe behaviors characterizing a professional that each student will be evaluated on during her/his/their assigned clinical practica and as well as in University of Vermont courses and laboratories. To develop the attributes of a professional each student will:

- arrive in the clinic and all classes at the expected time. This includes ready to start clinical practica at the designated time.
- show an interest in the professional courses, consistently exhibition propriety and good judgment in appearance, behavior and speech.
- cooperate and offer to help others when her/his/their own work is completed.
- demonstrate preparedness by timely and careful completion of required reading and writing assignments and maintain an organized and efficient work environment.
- consistently maintain confidentiality of patient information and releasing information only to authorized persons in accordance with the Health Insurance Portability and Accountability Act (HIPAA).
- behave with complete honesty and accept responsibility for own mistakes instead of ignoring them or hiding them.
- advocate the importance of professional association.
- adhere to the dress code and observe clinical safety rules in all professional courses.
- keep the work area clean, safe, and well supplied.
- adapt to unexpected changes in scheduling and display good judgment in assigning priorities when faced with several tasks.
- treat all patients, staff members and visitors respectfully at all times.
- accept constructive observations and feedback and heed instructions immediately.
- It is the student's responsibility to be fully aware of the policies and procedures of our educational partners where the student may be participating in clinical practica. Any violation of the policies and/or procedures of our educational partners and/or being deemed to create an unsafe environment for patients, staff, or fellow students; or failure to comply with the etiquette in accordance with the standards of the clinic or the CNHS is grounds for the student being uninvited from and returning to the affiliate location and may result in receiving a failing grade in the associated course.

ARRT Standards of Ethics

Students are required to follow and adhere to the American Registry of Radiologic Technologists (ARRT) Standards while in the radiation therapy program.

Students are required to read and abide by the ARRT Standards of Ethics, which can be found in appendix A of this manual.

When applying for ARRT certification and registration, all applicants will be asked the following questions

1. *Have you ever been charged with or convicted of a misdemeanor or felony? (This includes court convictions and military courts-martial.)*
2. *Has a regulatory authority or certification board (other than ARRT) ever done one or more of the following?*
    a. *Denied, revoked, or suspended your professional license, permit, registration, or certification?*
    b. *Placed you on probation (excluding ARRT Continuing Education probation), under consent agreement, or under consent order?*
    c. *Allowed voluntary surrender of your professional license, permit, registration, or certification?*
    d. *Subjected you to any conditions or disciplinary actions?*
3. *Have you ever been suspended, dismissed, or expelled from an educational program you attended to meet ARRT certification and registration requirements?*

If a student has convictions, criminal proceedings, or military court martial and feels the items listed above, please contact the Program Director immediately. Any criminal proceedings could prevent the student from meeting the requirements and taking the ARRT registry exam as she/he/they may not meet the requirements of the profession and therefore may not be eligible for the board registry/certification exam.

ASRT Practice Standards for Medical Imaging and Radiation Therapy

Students are required to follow and adhere to the American Society for Radiologic Technologists (ASRT) Practice Standards for Medical Imaging and Radiation Therapy.

An abbreviated version of the ASRT practice standards can be found in appendix B of this manual.

Essential Functions

The essential functions include additional non-academic requirements of our program, comprising the physical, emotional, and professional demands of the major and the profession. All radiation therapy (RADT) students are responsible for the essential functions outlined in this handbook. After reviewing the essential functions, the student will have a clearer understanding of the program's expectations. Throughout the student's professional studies, the ability to meet these functions will be evaluated and assessed. All RADT students are responsible for all of the following essential functions at a minimum. If a student is unable to meet the essential functions, with or without reasonable accommodations, the student may be dismissed from the program.

Cognitive functions

The student must be able to thoroughly, efficiently, and reliably:

- Recall, interpret, extrapolate, analyze, synthesize, evaluate, and apply information from a variety of sources, including reading material, lecture, discussion, patient observation, examination, and evaluation/assessment in a timely manner.
- Possess and apply mathematical skills and determine what data are needed to solve problems.
- Possess and apply critical thinking and problem-solving skills and have the ability to resolve issues in a timely manner.
- Apply knowledge, skills, and values learned from course work and life experiences to new situations.

Affective functions

The student must be able to:

- Establish professional, trusting, empathetic relationships with patients and their families, clinical staff, and the community.
- Demonstrate respect and engage in non-judgmental interactions regardless of an individual's age, gender, race, socio-economic status, religion, lifestyle, and/or culture.
- Work independently and effectively in groups under time constraints.
- Meet externally established deadlines.
- Be an active and engaged learner in classroom, lab, and clinical settings.
- Maintain alertness and concentration with cognitive, communication and psychomotor tasks for as long as three hours at a time within the academic environment, and as long as ten hours at a time within the clinical environment.
- Identify sources of stress and develop effective coping behaviors.
- Recognize and respond appropriately to potentially hazardous situations.
- Prioritize requests and work concurrently on at least two different tasks.
- Project an image of professionalism including appearance, attitude, dress, and confidence.

- Possess the psychological health required for full utilization of abilities.
- Recognize emergency situations and take appropriate action.

Communication functions

The student must be able to:

- Attend selectively and in a controlled and respectful manner to various types of communication, including the spoken and written word and non-verbal communication.
- Communicate effectively, timely, and accurately with patients, all clinical staff, and the community.
- Relay information in oral and written form effectively, accurately, reliably, thoroughly, and intelligibly to individuals and groups, using the English language; and
- Read and write English proficiently (typed and hand-written).

Radiation Therapy specific psychomotor functions

The student must be able to:

- Accurately and reliably inspect and observe the skin, facial expression, anatomical structures, posture and movement of others.
- Examine and evaluate/assess blood pressure, and lung and heart sounds.
- Accurately and reliably read equipment dials and monitors.
- Feel pulses, skin condition, muscle and tendon activity, and joint and limb movement.
- Negotiate level surfaces, ramps and stairs to assist patients/classmates appropriately.
- Lead patients/classmates through a variety of examinations and treatments typically requiring sitting, standing, squatting and kneeling on the floor or treatment table.
- Move from one surface level to another (e.g., floor to stand, stand to treatment table).
- React and effectively respond quickly to sudden or unexpected movements of patients/classmates.
- Manipulate dials, knobs, and other small to large parts and pieces of equipment.
- Maintain activity throughout an eight to ten-hour workday.
- Transport self/patients from one room to another, from one floor to another.
- Put on and take off patient clothing, including gowns.
- Independently put on and take off Personal Protective Equipment (PPE) (i.e., mask and gloves).
- Obtain and maintain Cardiopulmonary Resuscitation (CPR) Certification prior to and throughout all clinical practica rotations.
- Exhibit sufficient manual dexterity to manipulate small equipment such as syringes for intravenous injections; perform CPR; and treat acutely ill patients without disturbing sensitive monitoring instruments and lines.
- Manipulate another person's body in transfers, positioning, and other treatment or diagnostic techniques.
- Move dependent real or simulated patients, generating lifting forces of up to 75 pounds.

- Lift or carry up to 50 pounds.
- Reach above, reach out, and reach below to accomplish treatment and patient care.
- Work safely with potential chemical, radiologic, and biologic hazards using universal precautions.
- Accurately and reliably differentiate between red and green light.
- Independently navigate various levels of stairs or uneven surfaces throughout the day.

Clinical Accommodation Request

An academic accommodation that has been approved through Student Accessibility Services (SAS) does not transfer to the clinical setting. For an accommodation to be considered in the clinical practica setting, the student must meet with and provide all pertinent information requested through the Office of Student Accessibility Services (SAS). Once SAS has processed the request, they will contact the radiation therapy program director to determine if the accommodation request is reasonable.

Request *must* be made 6 weeks (minimum) in advance of any clinical course, which include RADT 173, RADT 174, RADT 223, RADT 274, RADT 279, and RADT 280. The student may or may not be able to participate in any clinical course until the accommodation request has been reviewed, approved, or denied.

Student Resources

Below are resources for student support at UVM. These resources are available to students who may be having difficulty meeting programmatic or academic expectations or simply feel they need additional help or resources.

Counseling and Psychiatry Services (CAPS): Support your mental health and learn how to thrive during your time at UVM. Your mental health is our top priority. Explore the options that are best for you in finding the support and connection you need. Call CAPS to schedule an appointment or ask questions about our services. Your first time seeing a CAPS counselor will be a consultation appointment.

Jacobs House
146 So. Williams St.
Phone: 802-656-3340
https://www.uvm.edu/health/CAPS

Student Accessibility Services (SAS): SAS provides accommodations to students with documented disabilities. Among the programs and services, SAS offers exam accommodations, meetings with Accessibility Specialists to receive advisement and advocacy around disability-related matters, ebooks, deaf and hard of hearing services, notetaking and adaptive technologies and more.

A-170 Living Learning Center
Phone: 802-656-7753
Email: access@uvm.edu
https://www.uvm.edu/academicsuccess/student_accessibility_services

Center for Academic Success: Offers subject area tutoring, supplemental instruction, learning skills, time management, and study skills.

244 Commons
Living/Learning Center
Phone: (802) 656-4075
Email: tutoring@uvm.edu
https://www.uvm.edu/academicsuccess/tutoring_center

If you find that MRS might not be the right field for you for any reason please talk with your Program Director or your Adviser. We would be happy to talk with you about the program or more about other possible majors that might fit your interests and skills.

Clinical Practica Policy for RADT 173, 174, & 223

Student Responsibilities:

1. Clinical Mandatories and Health Clearance Requirements MUST be completed and uploaded in CastleBranch by August 15th prior to the start of the next academic year in order to participate in the respective clinical practicum and RADT 173. Failure to complete the clinical mandatories and health clearance requirements by the required date may result in failure to participate in the clinical practicum and course, which could result in dismissal from the course or practicum.
    a. If there are additional mandatory training requirements from the University of Vermont Medical Center (UVMMC), they must be completed by the timeline given by the clinic. Failure to complete all requirements will result in the inability to participate in any course or practicum that occurs at UVMMC
2. Complete and maintain Cardiopulmonary Resusitation (CPR) training for Healthcare Professionals for all clinical practica.
    a. Students must have current CPR certification for the ARRT Registry examination.
3. Fulfill all University, College and program requirements for graduation.
4. Dress Code: Students in the clinic are required to purchase and wear scrubs (UVM Green only), which can be purchased at Joann's Uniform in Colchester. Students are required to wear a white or black crew neck t-shirt (short sleeve or long sleeve) under the scrub top. No other t-shirt type is allowed. Students are required to wear clean, closed toed shoes appropriate to the hospital setting.
    a. Students are required to abide by the UVMMC dress code while in the clinic.
5. Attendance:
    a. Clinical hours: Students will be in attendance per course requirements or according to the schedule set by the clinical instructor. Missed clinical hours are to be made up in accordance with the clinical practicum course. Students who are in the clinic for more than 4 hours per day will be offered a 15-minute break. If the student takes longer than a 15-minute break, the time in excess of 15 minutes will need to be made up.
    b. Spring break: Students will have the week of UVM spring break off unless hours need to be made up. Approval must be obtained from the Program Director or the UVM Clinical Coordinator and a UVMMC clinical preceptor.
    c. Planned absence: All planned absences require a minimum of one week notification and approval by the Clinical Coordinator.
6. Professional Behavior: Students will behave professionally following the guide established by the BHSC department and the clinical site. Failure to adhere to BHSC or clinical practica site's professional expectations may be cause for termination from the clinical site. *Please refer to the Professional Behavior Policy in this handbook.*
7. Clinical Competencies: Students must complete required competencies set per course syllabus. They must compile and submit all the completed clinical competencies to the UVM Clinical Coordinator.

Clinical Practica Policy for RADT 274, 279, & 280

Student Responsibilities:

1. Clinical Mandatories and Health Clearance Requirements MUST be completed by the dates set forth by the Clinical Education Team Lead for CNHS, BHSC to participate in the final clinical practicum. Failure to complete the clinical mandatories and health clearance requirements may result in failure to participate in the clinical practicum, which could result in dismissal from the course.
    a. If there are additional mandatory training requirements or testing from the respective clinical affiliate site, they must be completed by the timeline given by the clinic. Failure to complete all requirements will result in the inability to participate in the practicum.
2. Fulfill all University, College and program requirements for graduation prior to the start of the final semester.
3. Dress Code: Students will adhere to the dress code of the affiliate site with appropriate footwear. This includes wearing proper identification and a whole-body radiation monitor at all times while in the clinic.
4. Attendance:
    a. Clinical hours: Students will be in attendance 40 hours each week. Students will be given at least 30 minutes for lunch, dependent on the clinics policy. Morning and afternoon breaks will follow the clinic policy.
    b. Spring break: Students will have the week of UVM spring break off unless hours need to be made up. If hours need to be made up, approval must be obtained from the Clinical Coordinator or in her/his/their absence the UVM Program Director, *and* the Clinical Supervisor at the Affiliate site. Spring break cannot be switched for a different week.
    c. Planned absence/Personal days: Students are allowed the number of days allocated in the course syllabus during the affiliation period. These days may be used for sick days OR personal time off, including job interviews, and professional meetings. All planned absences require a minimum of one (1) week notification and approval by the Affiliate Clinical Preceptor and notification of this approval must be sent to the UVM RADT Clinical Coordinator or in her/his/their absence the UVM RADT Program Director.
5. Professional Behavior: Students will behave professionally following the guidance established by the BHSC department and the clinical affiliate site. Failure to adhere to BHSC or affiliate department professional expectations may be cause for termination from the clinical site. *Please refer to the Professional Behavior Policy in this handbook.*
6. On-line Report: Students must submit the minimum on-line reports as outlined in the syllabus. The mechanism for submitted the reports will also be outlined in the syllabus.
7. Clinical Competencies: Students must complete ***all*** required competencies as set for the by the American Registry of Radiologic Technologists (ARRT) and the program by the end of the semester. They must compile and submit all completed clinical

competencies to the UVM Program Director or in her/his/their absence to the UVM Clinical Coordinator as outlined in the syllabus.

8. Site selection will be completed in the fall semester prior to the RADT 274 clinical practicum. The sites will be selected through a lottery system that is equitable and fair. Students may not request specific sites to either her/his/their classmates, Clinical Coordinator, or the Program Director, or coerce, collude, or manipulate the site selection process. Failure to comply with this policy will result, at a minimum, in the student being placed last for a clinical affiliate site and/or placed before the UVM Center for Student Conduct.

Clinical Affiliate Responsibilities

1. Clinical Preceptor and Access Policy: Students are always directly supervised during their clinical experiences. The degree of supervision is commensurate with the amount of experience and competency of the student. At no time are students ever placed in a position of doing clinical work as replacement for a certified and/or licensed radiation therapist.
2. The affiliate site will allow students access to all areas of the Radiation Oncology department as necessary for their clinical experience. The student will have access to an internet- connected computer in order to access her/his/their UVM e-mail and to submit any online clinical documents, time reporting, etc.
3. Schedule: The clinical affiliate will be provided a rotation schedule to fulfill all the requirements of the clinical practicum. A copy of this schedule will be sent to each clinical affiliate site and available to the respective student(s). Any significant changes in the rotation schedule will be communicated to the student, Program Director, and Clinical Coordinator at UVM.
4. Orientation: Students will participate in the required Orientation at each institution, and they will be provided a structured orientation to their affiliate radiation oncology department. Documentation of the orientation will be provided to the clinical coordinator.
4. Student Evaluation: The Clinical Preceptor at each site will be responsible for overseeing evaluations for each student at the end of each clinical rotation.
5. The compiliation of all the final competencies is the responsibility of the student as they must submit them to the UVM Clinical Coordinator or in her/his/their absence to the UVM Program Director.

Radiation Safety Policy

All students in the Radiation Therapy Program understand the need to adhere to and practice radiation protection policies in the clinical area.

Radiation Protection

Students are required to always apply correct radiation protection practices; these principles will be taught during MLRS 140. At no time may a student participate in a procedure while using unsafe radiation protection practices. The student must always adhere to practices which reduce radiation exposure to patients, themselves, and other personnel. These include, but are not limited to, the following:

1 The student will not operate equipment in labs on campus or in the clinical setting without having an instructor readily available for supervision.
2 Students are never allowed to radiograph each other. Phantoms and positioning devices are provided for laboratory experiments and as teaching aids.
3 The student must always adhere to practices which reduce radiation exposure to self and others to As Low As Reasonably Achievable. (ALARA)
4 Any questionable practice must be reported to the Program Director and/or the Clinical Coordinator.

Radiation monitor badge

Each student is issued a whole-body radiation monitor badge (AKA badge) prior to her/his/their first clinical experience. The badges are distributed by the Clinical Coordinator in RADT 173, RADT 174. And RADT 223, at the beginning of the semester and then replaced monthly for the semester. For RADT 274 and 279, badges are mailed to the clinical affiliate site at the beginning of the semester and replaced monthly. The UVM Radiation Safety Officer and the RADT Program Director will review the reports monthly. If is student receives a dose higher then what is set by the Radiation Safety Officer, the student and the Program Director will be notified. The student can review the monthly radiation report by contacting the Radiation Safety Officer or the Program Director. Students are expected to:

1. appropriately wear a badge anytime the student is in the clinic. If the student does not have her/his/their badge she/he/they cannot remain in clinic.
2. return the badge to the Clinical Coordinator at the end of each month. If badges are not returned, the student may be charged for the missing badge.
3. appropriately care for the badge while in her/his/their possession.

Radiation Exposure Limits

The program follows the regulatory statues and guidelines of the appropriate State and the Nuclear Regulatory Commission (when required) in which the student is participating in her/his/their clinical practicum. In addition, the program follows the As Low As Reasonably Achievable (ALARA) principle in accordance with the maximum permissible total effective dose equivalent. If a student reaches ALARA level I, she/he/they will be counseled by the University's Radiation Safety Officer. To abide by these standards, the badge must be worn appropriately during clinical practica.

Radiation Safety Pregnancy Policy

While all students in the Radiation Therapy Program understand the need to adhere to and practice radiation protection policies in the clinical area, this is especially important for the female student who might be pregnant or become pregnant. Exposure to radiation may be harmful to the developing fetus, therefore, the female student may choose to voluntarily declare her pregnancy. Declaration of pregnancy must be made in writing and must include the approximate date of conception. Refer to Declaration of Pregnancy Form at the end of this Handbook.

The declared pregnant student will be advised as to the radiation and occupational hazards to her unborn child by the University of Vermont Radiation Safety Officer in consultation with the Program Director and Clinical Coordinator. The student will be monitored by University of Vermont officials throughout her pregnancy or completion of the program, whichever occurs first.

For the declared pregnant student, the NRC limits the dose to the embryo/fetus to 0.5 rem (5mSV) over the entire pregnancy. All efforts will be made to avoid substantial variation above a uniform monthly exposure rate (0.05 rem/month) (0.5 mSV/month). The student will be issued an additional badge (belly badge) that must be worn appropriately during clinical practica for the duration of pregnancy or completion of the program, whichever occurs first. Refer to NRC Regulatory Guide 8.13 http://pbadupws.nrc.gov/docs/ML0037/ML003739505.pdf for more information.

The declared pregnant student must inform her physician of her enrollment in the Radiation Therapy Program and obtain a written statement of her/his recommendations for continuing in the program.

The declared pregnant student may continue in both didactic and clinical education courses. If the student feels that they cannot continue in the program, they may apply for a leave of absence and reenter the program after the birth of the child. Reentry will be at the beginning of the appropriate semester if space is available as determined by the radiation therapy program director.

A student may undeclare their pregnancy in writing at any time.

Magnetic Resonance Imaging (MRI) Safety Policy

In the event that a student should observe an imaging procedure, she/he/they must review the MRI Safety Policy, review the safety checklist, and sign the attestation of such policy.

MRI uses strong magnetic fields to create a diagnostic image. The magnetic field that is generated is *always* on, therefore, continual safety precautions must be taken. The magnetic field is very sensitive to metal objects containing iron and other ferrous metals but can also interfere or cause damage to implanted or medical devices. Due to the potential risk of an adverse effect, no student is permitted to observe, participate, or be in the vicinity of a MRI machine until this protocol has been completed. If you would like to observe, participate, or be in the vicinity of a MRI machine you MUST communicated directly with the RADT Program Director.

If permission is granted, you must answer all the questions on the list of contraindications located on Trajecsys prior to any MRI interactions. Additionally, the list must be reviewed by the RADT Program Director and MRI personnel at the specific site in which participation is requested. If you should have a device or a medical condition that is not listed, please ask the clinical coordinator or program director prior to observing in MRI to allow an adequate clearance for everyone's safety.

Professional Courses

Students in the radiation therapy program must earn a grade of "C" or better in all professional courses. The numerical grade of "C" is determined per course and is at the discretion of the course instructor. Professional courses are listed below. Refer to the CNHS handbook for specific criteria for meeting academic standards.

Radiation Therapy
BHSC 034: Human Cell Biology
BHSC 140: Radiation Science
BHSC 175: Cross Sectional Imaging
BHSC 297: Leadership and Management in Healthcare
RADT 152: Principles of Radiation Therapy
RADT 176: Clinical Radiation Oncology
RADT 215: CT Procedures
RADT 244: Essentials of Patient Care
RADT 270: Dosimetry Concepts
RADT 275: Dosimetry
RADT 277: Techniques in Radiation Therapy
RADT 278: Senior Seminar in Radiation Therapy
RADT 280: Quality Assurance & Treatment Planning

Students must progressively pass *all* the clinical practica to take the sequential clinical course in order to meet the academic requirements for graduation and eligibility for the ARRT registry/certification exam. Refer to the CNHS and BHSC handbook for specific criteria for meeting academic standards.

Clinical Practica
RADT 173: Introduction to Clinical Practice (Clinical Practicum I)
RADT 174: Clinical Practicum II
RADT 223: Clinical Practicum III
RADT 274: Clinical Practicum IV
RADT 279: Final Practicum Overview

Student Acknowledgement Signature Page

_____ (*initials*) By my signing below, I acknowledge that I have received, read, understand and agree to abide by the University of Vermont Radiation Therapy Program Student Handbook, ARRT Standards of Ethics, and the ASRT Radiation Therapy Code of Standards. I understand that if I do not abide by the policies and meet essential functions, expectations, program, college, and University requirements, I may be discontinued from the program and the major.

_____ (*initials*) By signing below, I acknowledge that I have read, reflected, and able to meet all of the Essential Functions outlined in the RADT Student Handbook. _____ (*initials*) If I am unsure whether I am able to meet all of the Essential Functions, I have asked the appropriate personnel with any questions regarding the requirements. _____ (*initials*) I further acknowledge my understanding that academic accommodations do not transfer to the clinical setting. If I have a known disability that may require a clinical accommodation, I have preemptively discussed my disability or concerns with Student Accessibility Services (SAS). If, after discussing with SAS it is appropriate to submit a request for a reasonable accommodation, I have allowed 4-6 weeks for review. _____ (*initials*) I further understand that an accommodation request may or may not be reasonably accommodated.

_____ (*initials*) I also understand that it may become necessary for program officials to revise the contents of the Student Handbook prior to my completion of the program, in which case I agree to abide by the revisions and the most recent handbook.

_____ _____

Printed Name Date of Birth

_____ _____

Signature Date

Magnetic Resonance Imaging (MRI) Student Acknowledgement Signature Page

_____ (*initials*) By my signing below, I acknowledge that I have received, read, understand and agree to abide by the University of Vermont Radiation Therapy Program MRI observation policy. I agree to follow the process for requesting observation in a MRI department; failure to do so could have a grave impact to myself, patients, and staff. _____ (*initials*) I also understand that violating the observation policy may result in dismissal from the program.

_____ (*initials*) I also understand that it may become necessary for program officials to revise the contents of the Student Handbook prior to my completion of the program, in which case I agree to abide by the revisions.

_____ _____

Student Printed Name Student Date of Birth

_____ _____

Student Signature Date

_____

Program Director Printed Name

_____ _____

Signature Date

_____

MRI Supervisor Printed Name

_____ _____

MRI Supervisor Signature Date

Declaration of Pregnancy

I have received a copy of the University of Vermont's Radiation Safety Pregnancy Policy. Furthermore, I have read the policy and understand my rights and responsibilities.

_____	_____
Printed Name	Date of Birth
_____	_____
Signature	Date

THE AMERICAN REGISTRY
OF RADIOLOGIC
TECHNOLOGISTS®

Appendix A

ARRT STANDARDS OF ETHICS

Last Revised: September 1, 2021
Published: September 1, 2021

PREAMBLE

The *Standards of Ethics* of The American Registry of Radiologic Technologists (ARRT) shall apply solely to persons holding certificates from ARRT that are either currently certified and registered by ARRT or that were formerly certified and registered by ARRT (collectively, "Certificate Holders"), and to persons applying for certification and registration by ARRT (including persons who submit an Ethics Review Preapplication) in order to become Certificate Holders ("Candidates"). Radiologic Technology is an umbrella term that is inclusive of the disciplines of radiography, nuclear medicine technology, radiation therapy, cardiovascular-interventional radiography, mammography, computed tomography, magnetic resonance imaging, quality management, sonography, bone densitometry, vascular sonography, cardiac-interventional radiography, vascular-interventional radiography, breast sonography, and radiologist assistant. The *Standards of Ethics* are intended to be consistent with the Mission Statement of ARRT, and to promote the goals set forth in the Mission Statement.

STATEMENT OF PURPOSE

The purpose of the ethics requirements is to identify individuals who have internalized a set of professional values that cause one to act in the best interests of patients. This internalization of professional values and the resulting behavior is one element of ARRT's definition of what it means to be qualified. Exhibiting certain behaviors as documented in the *Standards of Ethics* is evidence of the possible lack of appropriate professional values.

The *Standards of Ethics* provides proactive guidance on what it means to be qualified and to motivate and promote a culture of ethical behavior within the profession. The ethics requirements support ARRT's mission of promoting high standards of patient care by removing or restricting the use of the credential by those who exhibit behavior inconsistent with the requirements.

A. CODE OF ETHICS

The Code of Ethics forms the first part of the *Standards of Ethics.* The Code of Ethics shall serve as a guide by which Certificate Holders and Candidates may evaluate their professional conduct as it relates to patients, healthcare consumers, employers, colleagues, and other members of the healthcare team. The Code of Ethics is intended to assist Certificate Holders and Candidates in maintaining a high level of ethical conduct and in providing for the protection, safety, and comfort of patients. The Code of Ethics is aspirational.

1. The Registered Technologist acts in a professional manner, responds to patient needs, and supports colleagues and associates in providing quality patient care.
2. The Registered Technologist acts to advance the principal objective of the profession to provide services to humanity with full respect for the dignity of mankind.
3. The Registered Technologist delivers patient care and service unrestricted by the concerns of personal attributes or the nature of the disease or illness, and without discrimination on the basis of race, color, creed, religion, national origin, sex, marital status, status with regard to public assistance, familial status, disability, sexual orientation, gender identity, veteran status, age, or any other legally protected basis.
4. The Registered Technologist practices technology founded upon theoretical knowledge and concepts, uses equipment and accessories consistent with the purposes for which they were designed, and employs procedures and techniques appropriately.
5. The Registered Technologist assesses situations; exercises care, discretion, and judgment; assumes responsibility for professional decisions; and acts in the best interest of the patient.
6. The Registered Technologist acts as an agent through observation and communication to obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient and recognizes that interpretation and diagnosis are outside the scope of practice for the profession.
7. The Registered Technologist uses equipment and accessories, employs techniques and procedures, performs services in accordance with an accepted standard of practice, and demonstrates expertise in minimizing radiation exposure to the patient, self, and other members of the healthcare team.
8. The Registered Technologist practices ethical conduct appropriate to the profession and protects the patient's right to quality radiologic technology care.

9. The Registered Technologist respects confidences entrusted in the course of professional practice, respects the patient's right to privacy, and reveals confidential information only as required by law or to protect the welfare of the individual or the community.

10. The Registered Technologist continually strives to improve knowledge and skills by participating in continuing education and professional activities, sharing knowledge with colleagues, and investigating new aspects of professional practice.

11. The Registered Technologist refrains from the use of illegal drugs and/or any legally controlled substances which result in impairment of professional judgment and/or ability to practice radiologic technology with reasonable skill and safety to patients.

B. RULES OF ETHICS

The Rules of Ethics form the second part of the *Standards of Ethics.* They are mandatory standards of minimally acceptable professional conduct for all Certificate Holders and Candidates. Certification and registration are methods of assuring the medical community and the public that an individual is qualified to practice within the profession. Because the public relies on certificates and registrations issued by ARRT, it is essential that Certificate Holders and Candidates act consistently with these Rules of Ethics. These Rules of Ethics are intended to promote the protection, safety, and comfort of patients.

The Rules of Ethics are enforceable. R.T.s are required to notify ARRT of any ethics violation, including state licensing issues and criminal charges and convictions, within 30 days of the occurrence or during their annual renewal of certification and registration, whichever comes first. Applicants for certification and registration are required to notify ARRT of any ethics violation, including state licensing issues and criminal charges and convictions, within 30 days of the occurrence.

Certificate Holders and Candidates engaging in any of the following conduct or activities, or who permit the occurrence of the following conduct or activities with respect to them, have violated the Rules of Ethics and are subject to sanctions as described hereunder:

The titles and headings are for convenience only, and shall not be used to limit, alter or interpret the language of any Rule.

Fraud or Deceptive Practices

Fraud Involving Certification and Registration

1. Employing fraud or deceit in procuring or attempting to procure, maintain, renew, or obtain or reinstate certification and registration as issued by ARRT; employment in radiologic technology; or a state permit, license, or registration certificate to practice radiologic technology. This includes altering in any respect any document issued by ARRT or any state or federal agency, or by indicating in writing certification and registration with ARRT when that is not the case.

Fraudulent Communication Regarding Credentials

2. Engaging in false, fraudulent, deceptive, or misleading communications to any person regarding any individual's education, training, credentials, experience, or qualifications, or the status of any individual's state permit, license, or registration certificate in radiologic technology or certificate of registration with ARRT.

Fraudulent Billing Practices

3. Knowingly engaging or assisting any person to engage in, or otherwise participating in, abusive or fraudulent billing practices, including violations of federal Medicare and Medicaid laws or state medical assistance laws.

Subversion

Examination / CQR Subversion

4. Subverting or attempting to subvert ARRT's examination process, and/or the Structured Self-Assessments (SSA) that are part of the *Continuing Qualifications Requirements* (CQR) process. Conduct that subverts or attempts to subvert ARRT's examination and/or CQR SSA process includes, but is not limited to:
    (i) disclosing examination and/or CQR SSA information using language that is substantially similar to that used in questions and/or answers from ARRT examinations and/or CQR SSA when such information is gained as a direct result of having been an examinee or a participant in a CQR SSA or having communicated with an examinee or a CQR participant; this includes, but is not limited to, disclosures to students in educational programs, graduates of educational programs, educators, anyone else involved in the preparation of Candidates to sit for the examinations, or CQR participants; and/or
    (ii) soliciting and/or receiving examination and/or CQR SSA information that uses language that is substantially similar to that used in questions and/or answers on ARRT examinations or CQR SSA from an examinee, or a CQR participant, whether requested or not; and/or
    (iii) copying, publishing, reconstructing (whether by memory or otherwise), reproducing or transmitting any portion of examination and/or CQR SSA materials by any means, verbal or written, electronic or mechanical, without the prior express written permission of ARRT or using professional, paid or repeat examination takers and/or CQR

SSA participants, or any other individual for the purpose of reconstructing any portion of examination and/or CQR SSA materials; and/or

(iv) using or purporting to use any portion of examination and/or CQR SSA materials that were obtained improperly or without authorization for the purpose of instructing or preparing any Candidate for examination or participant for CQR SSA; and/or

(v) selling or offering to sell, buying or offering to buy, or distributing or offering to distribute any portion of examination and/or CQR SSA materials without authorization; and/or

(vi) removing or attempting to remove examination and/or CQR SSA materials from an examination or SSA room; and/or

(vii) having unauthorized possession of any portion of or information concerning a future, current, or previously administered examination or CQR SSA of ARRT; and/or

(viii) disclosing what purports to be, or what you claim to be, or under all circumstances is likely to be understood by the recipient as, any portion of or "inside" information concerning any portion of a future, current, or previously administered examination or CQR SSA of ARRT; and/or

(ix) communicating with another individual during administration of the examination or CQR SSA for the purpose of giving or receiving help in answering examination or CQR SSA questions, copying another Candidate's or CQR participant's answers, permitting another Candidate or a CQR participant to copy one's answers, or possessing or otherwise having access to unauthorized materials including, but not limited to, notes, books, mobile devices, computers and/or tablets during administration of the examination or CQR SSA; and/or

(x) impersonating a Candidate, or a CQR participant, or permitting an impersonator to take or attempt to take the examination or CQR SSA on one's own behalf; and/or

(xi) using any other means that potentially alters the results of the examination or CQR SSA such that the results may not accurately represent the professional knowledge base of a Candidate, or a CQR participant.

Education Subversion

5. Subverting, attempting to subvert, or aiding others to subvert or attempt to subvert ARRT's education requirements, including but not limited to, *Continuing Education Requirements (CE),* clinical experience and competency requirements, structured education activities, and/or ARRT's *Continuing Qualifications Requirements* (CQR). Conduct that subverts or attempts to subvert ARRT's education or CQR Requirements includes, but is not limited to:
   (i) providing false, inaccurate, altered, or deceptive information related to CE, clinical experience or competency requirements, structured education or CQR activities to ARRT or an ARRT recognized recordkeeper; and/or
   (ii) assisting others to provide false, inaccurate, altered, or deceptive information related to education requirements or CQR activities to ARRT or an ARRT recognized recordkeeper; and/or
   (iii) conduct that results or could result in a false or deceptive report of CE, clinical experience or competency requirements, structured education activities or CQR completion; and/or
   (iv) conduct that in any way compromises the integrity of ARRT's education requirements, including, but not limited to, CE, clinical experience and competency requirements, structured education activities, or CQR Requirements such as sharing answers to the post-tests or self-learning activities, providing or using false certificates of participation, or verifying credits that were not earned or clinical procedures that were not performed.

Failure to Cooperate with ARRT Investigation

6. Subverting or attempting to subvert ARRT's certification and registration processes by:
   (i) making a false statement or knowingly providing false information to ARRT; or
   (ii) failing to cooperate with any investigation by ARRT in full or in part.

Unprofessional Conduct

Failure to Conform to Minimal Acceptable Standards

7. Engaging in unprofessional conduct, including, but not limited to:
   (i) a departure from or failure to conform to applicable federal, state, or local governmental rules regarding radiologic technology practice or scope of practice; or, if no such rule exists, to the minimal standards of acceptable and prevailing radiologic technology practice;
   (ii) any radiologic technology practice that may create unnecessary danger to a patient's life, health, or safety.

   Actual injury to a patient or the public need not be established under this clause.

Sexual Misconduct

8. Engaging in conduct with a patient that is sexual or may reasonably be interpreted by the patient as sexual, or in any verbal behavior that is seductive or sexually demeaning to a patient; or engaging in sexual exploitation of a patient or former patient. This also applies to any unwanted sexual behavior, verbal or otherwise.

Unethical Conduct

9. Engaging in any unethical conduct, including, but not limited to, conduct likely to deceive, defraud, or harm the public; or demonstrating a willful or careless disregard for the health, welfare, or safety of a patient. Actual injury need not be established under this clause.

Scope of Practice

Technical Incompetence

10. Performing procedures which the individual is not competent to perform through appropriate training and/or education or experience unless assisted or personally supervised by someone who is competent (through training and/or education or experience).

Improper Supervision in Practice

11. Knowingly assisting, advising, or allowing a person without a current and appropriate state permit, license, registration, or an ARRT registered certificate to engage in the practice of radiologic technology, in a jurisdiction that mandates such requirements.

Improper Delegation or Acceptance of a Function

12. Delegating or accepting the delegation of a radiologic technology function or any other prescribed healthcare function when the delegation or acceptance could reasonably be expected to create an unnecessary danger to a patient's life, health, or safety. Actual injury to a patient need not be established under this clause.

Fitness to Practice

Actual or Potential Inability to Practice

13. Actual or potential inability to practice radiologic technology with reasonable skill and safety to patients by reason of illness; use of alcohol, drugs, chemicals, or any other material; or as a result of any mental or physical condition.

Inability to Practice by Judicial Determination

14. Adjudication as mentally incompetent, mentally ill, chemically dependent, or dangerous to the public, by a court of competent jurisdiction.

Improper Management of Patient Records

False or Deceptive Entries

15. Improper management of records, including failure to maintain adequate patient records or to furnish a patient record or report required by law; or making, causing, or permitting anyone to make false, deceptive, or misleading entry in any patient record and/or any quality control record.

Failure to Protect Confidential Patient Information

16. Revealing a privileged communication from or relating to a former or current patient, except when otherwise required or permitted by law, or viewing, using, releasing, or otherwise failing to adequately protect the security or privacy of confidential patient information.

Knowingly Providing False Information

17. Knowingly providing false or misleading information that is directly related to the care of a former or current patient.

Violation of State or Federal Law or Regulatory Rule

Narcotics or Controlled Substances Law

18. Violating a state or federal narcotics or controlled substance law, even if not charged or convicted of a violation of law.

Regulatory Authority or Certification Board Rule

19. Violating a rule adopted by a state or federal regulatory authority or certification board resulting in the individual's professional license, permit, registration or certification being denied, revoked, suspended, placed on probation or a consent agreement or order, voluntarily surrendered, subjected to any conditions, or failing to report to ARRT any of the violations or actions identified in this Rule.

Criminal Proceedings

20. Convictions, criminal proceedings, or military courts-martial as described below:
    - (i) conviction of a crime, including, but not limited to, a felony, a gross misdemeanor, or a misdemeanor. All alcohol and/or drug related violations must be reported; and/or
    - (ii) criminal proceeding where a finding or verdict of guilt is made or returned but the adjudication of guilt is either withheld, deferred, or not entered or the sentence is suspended or stayed; or a criminal proceeding where the individual enters an Alford plea, a plea of guilty or nolo contendere (no contest); or where the individual enters into a pre-trial diversion activity; and/or
    - (iii) military courts-martial related to any offense identified in these Rules of Ethics; and/or
    - (iv) required sex offender registration.

Duty to Report

Failure to Report Violation

21. Knowing of a violation or a probable violation of any Rule of Ethics by any Certificate Holder or Candidate and failing to promptly report in writing the same to ARRT.

Failure to Report Error

22. Failing to immediately report to the Certificate Holder's or Candidate's supervisor information concerning an error made in connection with imaging, treating, or caring for a patient. For purposes of this rule, errors include any departure from the standard of care that reasonably may be considered to be potentially harmful, unethical, or improper (commission). Errors also include behavior that is negligent or should have occurred in connection with a patient's care, but did not (omission). The duty to report under this rule exists whether or not the patient suffered any injury.

C. ADMINISTRATIVE PROCEDURES

These Administrative Procedures provide for the structure and operation of the Ethics Committee; they detail procedures followed by the Ethics Committee and by the Board of Trustees of ARRT in handling challenges raised under the Rules of Ethics, and in handling matters relating to the denial of an application for certification and registration (for reasons other than failure to meet the criteria as stated in Article II, Sections 2.03 and 2.04 of the *Rules and Regulations* of ARRT, in which case, there is no right to a hearing) or the denial of renewal or reinstatement of certification and registration. All Certificate Holders and Candidates are required to comply with these Administrative Procedures. All Certificate Holders and Candidates are expected to conduct themselves in a professional and respectful manner in their interactions with the ARRT Board of Trustees, Ethics Committee and/or staff. Failure to cooperate with the Ethics Committee or the Board of Trustees in a proceeding involving a challenge or ethics review may be considered by the Ethics Committee and by the Board of Trustees according to the same procedures and with the same sanctions as failure to observe the Rules of Ethics.

1. Ethics Committee

(a) Membership and Responsibilities of the Ethics Committee
The President, with the approval of the Board of Trustees, appoints at least three Trustees to serve as members of the Ethics Committee, each such person to serve on the Committee until removed and replaced by the President, with the approval of the Board of Trustees, at any time, with or without cause. The President, with the approval of the Board of Trustees, will also appoint a fourth, alternate member to the Committee. The alternate member will participate on the Committee in the event that one of the members of the Ethics Committee is unable to participate. The Ethics Committee is responsible for: (1) investigating each alleged breach of the Rules of Ethics and determining whether a Certificate Holder or Candidate has failed to observe the Rules of Ethics and determining an appropriate sanction; and (2) periodically assessing the Code of Ethics, Rules of Ethics, and Administrative Procedures and recommending any amendments to the Board of Trustees.

(b) The Chair of the Ethics Committee
The President, with the approval of the Board of Trustees, appoints one member of the Ethics Committee as the Committee's Chair to serve for a term of two years as the principal administrative officer responsible for management of the promulgation, interpretation, and enforcement of the *Standards of Ethics*. The President may remove and replace the Chair of the Committee, with the approval of the Board of Trustees, at any time, with or without cause. The Chair presides at and participates in meetings of the Ethics Committee and is responsible directly and exclusively to the Board of Trustees, using staff, legal counsel, and other resources necessary to fulfill the responsibilities of administering the *Standards of Ethics.*

(c) Preliminary Screening of Potential Violations of the Rules of Ethics
The Chair of the Ethics Committee shall review each alleged violation of the Rules of Ethics that is brought to the attention of the Ethics Committee. If, in the sole discretion of the Chair: (1) there is insufficient information upon which to base a charge of a violation of the Rules of Ethics; or (2) the allegations against the Certificate Holder or Candidate are patently frivolous or inconsequential; or (3) the allegations, if true, would not constitute a violation of the Rules of Ethics, the Chair may summarily dismiss the matter. The Chair may be assisted by staff and/or legal counsel of ARRT. The Chair shall report each such summary dismissal to the Ethics Committee.

At the Chair's direction and upon request, the Chief Executive Officer of ARRT shall have the power to investigate allegations regarding the possible settlement of an alleged violation of the Rules of Ethics. The Chief Executive Officer may be assisted by staff members and/or legal counsel of ARRT. The Chief Executive Officer is not empowered to enter into a binding settlement, but rather may convey and/or recommend proposed settlements to the Ethics Committee. The Ethics Committee may accept the proposed settlement, make a counterproposal to the Certificate Holder or Candidate, or reject the proposed settlement and proceed under these Administrative Procedures.

2. Hearings

Whenever ARRT proposes to take action in respect to the denial of an application for certification and registration (for reasons other than failure to meet the criteria as stated in Article II, Sections 2.03 and 2.04 of the *Rules and Regulations* of ARRT, in which case there is no right to a hearing) or of an application for renewal or reinstatement of certification and registration, or in

connection with the revocation or suspension of certification and registration, or the censure of a Certificate Holder or Candidate for an alleged violation of the Rules of Ethics, it shall give written notice thereof to such person, specifying the reasons for such proposed action. A Certificate Holder or Candidate to whom such notice is given shall have 30 days from the date the notice of such proposed action is mailed to make a written request for a hearing. The written request for a hearing must be accompanied by a nonrefundable hearing fee in the amount of $100. In rare cases, the hearing fee may be waived, in whole or in part, at the sole discretion of the Ethics Committee.

Failure to make a written request for a hearing and to remit the hearing fee (unless the hearing fee is waived in writing by ARRT) within such period or submission of a properly executed Hearing Waiver form within such period shall constitute consent to the action taken by the Ethics Committee or the Board of Trustees pursuant to such notice. A Certificate Holder or Candidate who requests a hearing in the manner prescribed above shall advise the Ethics Committee of the intention to appear at the hearing. A Certificate Holder or Candidate who requests a hearing may elect to appear in person, via teleconference, or by a written submission which shall be verified or acknowledged under oath.

A Certificate Holder or Candidate may waive the 30 day timeframe to request a hearing. To request a waiver of the 30 day timeframe, the Certificate Holder or Candidate must complete a Hearing Waiver form that is available on the ARRT website at www.arrt.org. The Hearing Waiver form must be signed by the Certificate Holder or Candidate, notarized, and submitted to ARRT. The Chief Executive Officer of ARRT shall have the authority to receive, administer, and grant the Hearing Waiver form and may be assisted by staff members and/or legal counsel of ARRT.

Failure to appear at the hearing in person or via teleconference, or to supply a written submission in response to the charges shall be deemed a default on the merits and shall be deemed consent to whatever action or disciplinary measures that the Ethics Committee determines to take. Hearings shall be held at such date, time, and place as shall be designated by the Ethics Committee or the Chief Executive Officer. The Certificate Holder or Candidate shall be given at least 30 days notice of the date, time, and place of the hearing. The hearing is conducted by the Ethics Committee with any three or more of its members participating, other than any members of the Ethics Committee who believe for any reason that they would be unable to render an objective and unbiased decision. In the event of such disqualification, the President may appoint Trustees to serve on the Ethics Committee for the sole purpose of participating in the hearing and rendering a decision. At the hearing, ARRT shall present the charges against the Certificate Holder or Candidate in question, and the facts and evidence of ARRT in respect to the basis or bases for the proposed action or disciplinary measure. The Ethics Committee may be assisted by legal counsel. The Certificate Holder or Candidate in question, by legal counsel or other representative (at the sole expense of the Certificate Holder or Candidate in question), shall have the right to call witnesses, present testimony, and be heard in the Certificate Holder's or Candidate's own defense; to hear the testimony of and to cross-examine any witnesses appearing at such hearing; and to present such other evidence or testimony as the Ethics Committee shall deem appropriate to do substantial justice. Any information may be considered that is relevant or potentially relevant. The Ethics Committee shall not be bound by any state or federal rules of evidence. The Certificate Holder or Candidate in question shall have the right to submit a written statement at the close of the hearing. A transcript or an audio recording of the hearing testimony is made for in person and teleconference hearings only. Ethics Committee deliberations are not recorded.

In the case where ARRT proposes to take action in respect to the denial of an application for certification and registration (for reasons other than failure to meet the criteria as stated in Article II, Sections 2.03 and 2.04 of the *Rules and Regulations* of ARRT) or the denial of renewal or reinstatement of certification and registration, the Ethics Committee shall assess the evidence presented at the hearing, or continue the matter and request the Certificate Holder or Candidate provide additional evidentiary information prior to making its decision, and shall subsequently prepare written findings of fact and its determination as to whether grounds exist for the denial of an application for certification and registration or renewal or reinstatement of certification and registration, and shall promptly transmit the same to the Board of Trustees and to the Certificate Holder or Candidate in question.

In the case of alleged violations of the Rules of Ethics by a Certificate Holder or Candidate, the Ethics Committee shall assess the evidence presented at the hearing, or continue the matter and request the Certificate Holder or Candidate provide additional evidentiary information prior to making its decision, and shall subsequently prepare written findings of fact and its determination as to whether there has been a violation of the Rules of Ethics and, if so, the appropriate sanction, and shall promptly transmit the same to the Board of Trustees and to the Certificate Holder or Candidate in question. Potential sanctions include denial of renewal or reinstatement of certification and registration with ARRT, revocation or suspension of certification and registration with ARRT, or the public or private reprimand of a Certificate Holder or Candidate. Unless a timely appeal from any findings of fact and determination by the Ethics Committee is taken to the Board of Trustees in accordance with Section 3 below (Appeals), the Ethics Committee's findings of fact and determination in any matter (including the specified sanction) shall be final and binding upon the Certificate Holder or Candidate in question.

3. Appeals

Except as otherwise noted in these Administrative Procedures, the Certificate Holder or Candidate may appeal any decision of the Ethics Committee to the Board of Trustees by submitting a written request for an appeal within 30 days after the decision of the Ethics Committee is mailed. The written request for an appeal must be accompanied by a nonrefundable appeal fee in the amount of $250. In rare cases, the appeal fee may be waived, in whole or in part, at the sole discretion of the Ethics Committee.

Failure to make a written request for an appeal and to remit the appeal fee (unless the appeal fee is waived in writing by ARRT) within such period or submission of a properly executed Appeal Waiver form within such period shall constitute consent to the action taken by the Ethics Committee or Board of Trustees pursuant to such notice.

A Certificate Holder or Candidate may waive the 30 day timeframe to request an appeal. To request a waiver of the 30 day timeframe, the Certificate Holder or Candidate must complete an Appeal Waiver form that is available on the ARRT website at www.arrt.org. The Appeal Waiver form must be signed by the Certificate Holder or Candidate, notarized, and submitted to ARRT. The Chief Executive Officer of ARRT shall have the authority to receive, administer, and grant the Appeal Waiver form and may be assisted by staff members and/or legal counsel of ARRT.

In the event of an appeal, those Trustees who participated in the hearing of the Ethics Committee shall not participate in the appeal. The remaining members of the Board of Trustees shall consider the decision of the Ethics Committee, the files and records of ARRT applicable to the case at issue, and any written appellate submission of the Certificate Holder or Candidate in question, and shall determine whether to affirm or to modify the decision of the Ethics Committee or to remand the matter to the Ethics Committee for further consideration. In making such determination to affirm or to modify, findings of fact made by the Ethics Committee shall be conclusive if supported by any evidence. The Board of Trustees may grant re-hearings, hear additional evidence, or request that ARRT or the Certificate Holder or Candidate in question provide additional information in such manner, on such issues, and within such time as it may prescribe. All hearings and appeals provided for herein shall be private at all stages. It shall be considered an act of professional misconduct for any Certificate Holder or Candidate to make an unauthorized publication or revelation of the same, except to the Certificate Holder's or Candidate's attorney or other representative, immediate superior, or employer.

4. Adverse Decisions

(a) Private Reprimands
A private reprimand is a reprimand that is between the individual and ARRT and is not reported to the public. Private reprimands allow for continued certification and registration.

(b) Public Reprimands
A public reprimand is a sanction that is published on ARRT's website for a period of one year. Public reprimands allow for continued certification and registration.

(c) Conditional
Conditional status may be given for continued certification and registration in those cases where there are additional requirements that need to be met before the ethics file can be closed (e.g., court, regulatory authority and/or Ethics Committee conditions).

(d) Suspensions
Suspension is the temporary removal of an individual's certification and registration in all categories for up to one year.

(e) Summary Suspensions
Summary suspension is an immediate suspension of an individual's certification and registration in all categories. If an alleged violation of the Rules of Ethics involves the occurrence, with respect to a Certificate Holder, of an event described in the Rules of Ethics, or any other event that the Ethics Committee determines would, if true, potentially pose harm to the health, safety, or well being of any patient or the public, then, notwithstanding anything apparently or expressly to the contrary contained in these Administrative Procedures, the Ethics Committee may, without prior notice to the Certificate Holder and without a prior hearing, summarily suspend the certification and registration of the Certificate Holder pending a final determination under these Administrative Procedures with respect to whether the alleged violation of the Rules of Ethics in fact occurred. Within five working days after the Ethics Committee summarily suspends the certification and registration of a Certificate Holder in accordance with this provision, the Ethics Committee shall, by certified mail, return receipt requested, give to the Certificate Holder written notice that describes: (1) the summary suspension; (2) the reason or reasons for it; and (3) the right of the Certificate Holder to request a hearing with respect to the summary suspension by written notice to the Ethics Committee, which written notice must be received by the Ethics Committee not later than 15 days after the date of the written notice of summary suspension by the Ethics Committee to the Certificate Holder. If the Certificate Holder requests a hearing in a timely manner with respect to the summary suspension, the hearing shall be held before the Ethics Committee or a panel comprised of no fewer than three members of the Ethics Committee as promptly as practicable, but in any event within 30 days after the Ethics Committee's receipt of the Certificate Holder's request for the hearing, unless both the individual and the Ethics Committee agree to a postponement beyond the 30 day period. The Ethics Committee has the absolute discretion to deny any request for a postponement and to proceed to a hearing with or without the participation of the individual. The applicable provisions of Section 2 (Hearings) of these Administrative Procedures shall govern all hearings with respect to summary suspensions, except that neither a determination of the Ethics Committee, in the absence of a timely request for a hearing by the affected Certificate Holder, nor a determination by the Ethics Committee or a panel, following a timely requested hearing, is appealable to the Board of Trustees.

(f) Ineligible
An individual may be determined ineligible for certification and registration or ineligible for reinstatement of certification and registration. The time frame may be time limited or permanent.

(g) Revocation
Revocation removes the individual's certification and registration in all categories. The time frame may be time limited or permanent.

(h) Alternative Dispositions
An Alternative Disposition ("AD") is a contract between an individual and the ARRT Ethics Committee that allows for continued certification and registration in lieu of revocation, provided the individual performs certain requirements, including, but not limited to, providing documentation, attending counseling and/or submitting to random drug and/or alcohol screening. A Certificate Holder or Candidate who voluntarily enters into an Alternative Disposition Agreement agrees to waive all rights set forth in these Administrative Procedures.

(i) Civil or Criminal Penalties
Conduct that violates ARRT's Rules of Ethics may also violate applicable state or federal law. In addition to the potential sanctions under the *Standards of Ethics*, ARRT may, without giving prior notice, pursue civil and/or criminal penalties against the Certificate Holder or Candidate.

5. Publication of Adverse Decisions

Summary suspensions and final decisions (other than private reprimands) that are adverse to the Certificate Holder or Candidate will be communicated to the appropriate authorities of certification organizations and state licensing agencies and provided in response to written inquiries into an individual's certification and registration status. The ARRT shall also have the right to publish any final adverse decisions and summary suspensions and the reasons therefore. For purposes of this paragraph, a "final decision" means and includes: a determination of the Ethics Committee relating to an adverse decision if the affected Certificate Holder or Candidate does not request a hearing in a timely manner; a non-appealable decision of the Ethics Committee; an appealable decision of the Ethics Committee from which no timely appeal is taken; and, the decision of the Board of Trustees in a case involving an appeal of an appealable decision of the Ethics Committee.

6. Procedure to Request Removal of a Sanction

A sanction imposed by ARRT, including a sanction specified in a Settlement Agreement, specifically provides a sanction time frame and it shall be presumed that a sanction may only be reconsidered after the time frame has elapsed. At any point after a sanction first becomes eligible for reconsideration, the individual may submit a written request ("Request") to ARRT asking the Ethics Committee to remove the sanction. The Request must be accompanied by a nonrefundable fee in the amount of $250. A Request that is not accompanied by the fee will be returned to the individual and will not be considered. In rare cases, the fee may be waived, in whole or in part, at the sole discretion of the Ethics Committee. The individual is not entitled to make a personal appearance before the Ethics Committee in connection with a Request to remove a sanction or to modify a Settlement Agreement.

Although there is no required format, Requests for both sanction removal and Settlement Agreement modification must include compelling reasons justifying the removal of the sanction or modification of the Settlement Agreement. It is recommended that the individual demonstrate at least the following: (1) an understanding of the reasons for the sanction; (2) an understanding of why the action leading to the sanction was felt to warrant the sanction imposed; and (3) detailed information demonstrating that the Certificate Holder's or Candidate's behavior has improved and similar activities will not be repeated. Letters of recommendation from individuals, who are knowledgeable about the person's sanction imposed; and current character and behavior, including efforts at rehabilitation, are advised. If a letter of recommendation is not on original letterhead or is not duly notarized, the Ethics Committee shall have the discretion to ignore that letter of recommendation.

Removal of the sanction is a prerequisite to apply for certification and registration. If, at the sole discretion of the Ethics Committee, the sanction is removed, the individual will be allowed to pursue certification and registration via the policies and procedures in place at that time as stated in Section 6.05 of the *ARRT Rules and Regulations*.

If the Ethics Committee denies a Request for removal of the sanction or modification of a Settlement Agreement, the decision is not subject to a hearing or to an appeal, and the Committee will not reconsider removal of the sanction or modification of the Settlement Agreement for as long as is directed by the Committee.

7. Amendments to the *Standards of Ethics*

The ARRT reserves the right to amend the *Standards of Ethics* following the procedures under Article XI, Section 11.02 of the *ARRT Rules and Regulations*.

Appendix B

The ASRT Practice Standards for Medical Imaging and Radiation Therapy

Revised for UVM Radiation Therapy Program Student Manual (07/2022)

Table of Contents

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.
- *Glossary* – defines terms used in the practice standards document.
- *Advisory Opinion Statements* – provide explanations of the practice standards and are intended for clarification and guidance for specific practice issues.

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.
- *General Criteria* – written in a style that applies to medical imaging and radiation therapy professionals and should be used for the appropriate area of practice.

- *Specific Criteria* – meet the needs of the individuals in the various areas of professional performance. Although many areas of performance within medical imaging and radiation therapy are similar, others are not. The specific criteria were developed with these differences in mind.

Within this document, all organizations are referenced by their abbreviation and spelled out within the glossary.

Introduction

Definition

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 resonance technologist, mammographer, medical dosimetrist, nuclear medicine technologist, quality management technologist, radiation therapist, radiographer, radiologist assistant or sonographer 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.

The complex nature of disease processes involves multiple imaging modalities. Medical imaging and radiation therapy professionals are vital members of a multidisciplinary team that forms a core of highly trained health care professionals, who each bring expertise to the area of 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. A medical imaging and radiation therapy professional recognizes elements unique to each patient, which is essential for the successful completion of the procedure.

Medical imaging and radiation therapy professionals are the primary liaison between patients, licensed practitioners and other members of the support team. These professionals must remain sensitive to the needs of the patient through good communication, patient assessment, patient monitoring and patient care skills. 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 to include their area of practice to enhance patient care, safety, public education, knowledge and technical competence.

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 completion of densitometric procedures.

Cardiac-Interventional and Vascular-Interventional Technology

The practice of cardiac-interventional and vascular-interventional technology is performed by health care professionals responsible for the administration of ionizing radiation for diagnostic, therapeutic or research purposes. A cardiac-interventional and vascular-interventional technologist performs radiographic, fluoroscopic and other procedures and acquires and analyzes data needed for diagnosis at the request of and for interpretation by a licensed practitioner.

Cardiac-interventional and vascular-interventional technologists independently perform or assist the licensed practitioner in the completion of cardiac-interventional and vascular-interventional technology procedures. Cardiac-interventional and vascular-interventional technologists prepare, administer and document activities related to medications and radiation exposure in accordance with federal and state laws, regulations or lawful institutional policy.

Computed Tomography

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

Computed tomography technologists independently perform or assist the licensed practitioner in the completion of computed tomography and molecular imaging procedures. Computed tomography technologists prepare, administer and document activities related to medications and radiation exposure in accordance with federal and state laws, regulations or lawful institutional policy.

Limited X-ray Machine Operator

The operation of x-ray equipment in a limited scope is performed by health care employees responsible for the administration of ionizing radiation for diagnostic purposes. A limited x-ray machine operator performs radiographic procedures within the limited scope of practice and acquires and analyzes data needed for diagnosis at the request of and for interpretation by a licensed practitioner.

Limited x-ray machine operators are individuals other than a radiographer who perform static diagnostic radiographic images on selected anatomical sites. Limited x-ray machine operators perform their duties under the direction of a licensed practitioner, radiographer or, when indicated, a medical physicist.

Magnetic Resonance

The practice of magnetic resonance is performed by health care professionals responsible for the use of radiofrequencies within a magnetic field for diagnostic, therapeutic or research purposes. A magnetic resonance technologist performs magnetic resonance and molecular imaging procedures and acquires and analyzes data needed for diagnosis at the request of and for interpretation by a licensed practitioner.

Magnetic resonance technologists independently perform or assist the licensed practitioner in the completion of magnetic resonance and molecular imaging procedures. Magnetic resonance technologists prepare, administer and document activities related to medications in accordance with federal and state laws, regulations or lawful institutional policy.

Mammography

The practice of mammography is performed by health care professionals responsible for the administration of ionizing radiation and multi-frequency sound waves for diagnostic, therapeutic or research purposes. A mammographer performs breast imaging procedures and acquires and analyzes data, including mammographic and sonographic images needed for diagnosis, at the request of and for interpretation by a licensed practitioner.

Mammographers independently perform or assist the licensed practitioner in the completion of mammographic and sonographic breast imaging procedures. Mammographers prepare, administer and document activities related to medications and radiation exposure in accordance with federal and state laws, regulations or lawful institutional policy.

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 maintain a commitment to a high degree of accuracy, thoroughness and safety.

Medical dosimetrists must maintain a high degree of accuracy in treatment planning optimization, treatment techniques and positioning. Medical dosimetrists assist the radiation oncologist in localizing the treatment area, generate a treatment plan and actively 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 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 and treatment planning of various pathological conditions. A nuclear medicine technologist performs nuclear medicine and molecular imaging procedures or therapies and acquires and analyzes data at the request of and for interpretation by a licensed practitioner and under the supervision of an authorized user. Nuclear medicine technologists also administer the prescribed radionuclide therapy to the patient at the request and under the supervision of an authorized user.

Nuclear medicine technologists independently perform or assist the licensed practitioner and authorized user in the completion of nuclear medicine and molecular imaging procedures and

treatments. Nuclear medicine technologists prepare, administer and document activities related to ionizing radiation (radioactive material and computed tomography), nonionizing radiation, medications and radiation exposure in accordance with federal and state laws, regulations or lawful institutional policy.

Quality Management

The practice of quality management is performed by health care professionals responsible for the identification, measurement, control and improvement of the various core processes that will ultimately lead to improved medical imaging and radiation therapy department performance.

Today's medical imaging and radiation therapy departments involve multiple modalities, creating an interdisciplinary team. The quality management technologist is a member of the health care team, which includes clinicians, management, support staff and customers.

Quality management has four main components: quality planning, quality control, quality assurance and quality improvement. Quality management focuses on the means to achieve image and service quality. A quality management technologist combines all of these components to ensure efficient and effective patient care.

Quality management technologists independently perform or assist the medical physicist in the completion of quality control procedures. Quality management technologists prepare, administer and document activities related to all facets of quality management in accordance with federal and state laws, regulations or lawful institutional policy.

Radiation Therapy

The practice of radiation therapy is performed by health care professionals responsible for the administration of high doses of ionizing radiation for the purpose of treating pathologies, primarily cancer. A radiation therapist acquires and analyzes data in preparation for patient treatment, uses various imaging technologies to localize the treatment area, participates in treatment planning and performs radiation therapy procedures as prescribed and supervised by a radiation oncologist.

Radiation therapists are the primary liaison between patients and other members of the radiation oncology team. They also provide a link to other health care providers, such as social workers and dietitians. Radiation therapists must remain sensitive to the needs of the patient through good communication, patient assessment, patient monitoring and patient care skills. Radiation therapy often involves daily treatments extending over several weeks using highly sophisticated equipment. It requires thorough initial planning as well as constant patient care and monitoring.

Radiography

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

Radiographers independently perform or assist the licensed practitioner in the completion of radiographic and fluoroscopic procedures. Radiographers prepare, administer and document activities related to medications and radiation exposure in accordance with federal and state laws, regulations or lawful institutional policy.

Radiologist Assistant

A radiologist assistant is an advanced-practice radiographer who practices under the supervision of a radiologist and enhances patient care in radiology services. As a member of the radiologist-directed team, the radiologist assistant performs invasive and noninvasive procedures at the request of and for interpretation by a licensed practitioner.

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 good 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 federal and state laws, regulations and lawful institutional policies.

Sonography

The practice of sonography is performed by health care professionals responsible for the administration of multi-frequency sound waves and other techniques for diagnostic, therapeutic or research purposes. A sonographer performs sonographic and molecular imaging procedures and acquires and analyzes data needed for diagnosis at the request of and for interpretation by a licensed practitioner.

Sonographers independently perform or assist the licensed practitioner in the completion of sonographic and molecular imaging procedures. Sonographers prepare, administer and document activities related to medications in accordance with federal and state laws, regulations or lawful institutional policy.

Education and Certification

The individual 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.

Medical imaging and radiation therapy professionals performing multiple modality hybrid imaging should be registered by certification agencies recognized by the ASRT and be educationally prepared and clinically competent in the specific modality(ies) they are responsible to perform. Medical imaging and radiation therapy professionals performing diagnostic procedures in more than one imaging modality will adhere to the general and specific criteria for each area of practice.

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

Bone Densitometry

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

Bone densitometry technologists prepare for their roles on the interdisciplinary team by meeting postprimary examination eligibility criteria as determined by the ARRT

Those passing the ARRT bone densitometry postprimary examination use the additional credential (BD).

The ISCD is another certifying agency. Individuals with a primary medical imaging or radiation therapy certification who pass the ISCD certified bone densitometry technologist examination use the additional credential CBDT.

Cardiac-Interventional and Vascular-Interventional Technology

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

Cardiac-interventional and vascular-interventional technologists prepare for their roles on the interdisciplinary team by meeting postprimary examination eligibility criteria as determined by the ARRT or CCI

Those passing the ARRT cardiac-interventional, cardiovascular- interventional or vascular-interventional radiography postprimary examinations use the additional credentials (CI), (CV) or (VI), respectively.

CCI is another certifying agency. Individuals with primary certification in radiography who pass the CCI cardiovascular invasive specialist examination as a postprimary certification use the additional credential RCIS.

Computed Tomography

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

Computed tomography technologists prepare for their roles on the interdisciplinary team by meeting postprimary examination eligibility criteria as determined by the ARRT or NMTCB.

Those passing the ARRT or NMTCB computed tomography postprimary examination use the additional credential (CT).

Limited X-ray Machine Operator

Limited x-ray machine operators prepare for their roles on the interdisciplinary team in several ways. Various education and training programs for limited x-ray machine operators exist throughout the United States.

Many states require the completion of a program of study prior to administering a state licensure exam for limited x-ray machine operators. Several states use some or all of the Limited Scope of Practice in Radiography state licensing exams developed by the ARRT. States that administer an exam and issue a license or certification may use various terminologies to designate a limited x-ray machine operator. Limited x-ray machine operators shall only perform ionizing radiation procedures within their limited scope of practice.

Magnetic Resonance

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

Magnetic resonance technologists prepare for their role on the interdisciplinary team by meeting primary or postprimary examination eligibility criteria as determined by the ARRT.

Those passing the ARRT magnetic resonance primary examination use the credential R.T.(MR).

Those passing the ARRT magnetic resonance postprimary examination use the additional credential (MR).

Mammography

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

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

Those passing the ARRT mammography postprimary examination use the additional credential (M).

Those passing the ARRT breast sonography postprimary examination use the additional credential (BS).

Medical Dosimetry

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

Medical dosimetrists prepare for their roles on the interdisciplinary team by meeting the examination eligibility criteria established by the MDCB. Those passing the medical dosimetry examination use the credential CMD.

Nuclear Medicine

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

Nuclear medicine technologists prepare for their roles on the interdisciplinary team by meeting examination eligibility criteria as determined by the ARRT or NMTCB. Those passing the ARRT examination use the credential R.T.(N). Those passing the NMTCB examination use the credential CNMT.

Those passing the NMTCB nuclear cardiology, positron emission tomography or radiation safety specialty examinations use the additional credentials NCT, PET or NMTCB (RS), respectively.

Quality Management

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

Quality management technologists prepare for their roles on the interdisciplinary team by meeting postprimary examination eligibility criteria as determined by the ARRT

Those passing the ARRT quality management postprimary examination use the additional credential (QM).

Radiation Therapy

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

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

Those passing the ARRT radiation therapy examination use the credential R.T.(T).

Radiography

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

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

Those passing the ARRT radiography examination use the credential R.T.(R).

Radiologist Assistant

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

Radiologist assistants prepare for their roles as advanced-practice radiographers in medical imaging by meeting examination eligibility criteria as determined by the ARRT.

Those passing the registered radiologist assistant examination use the additional credential R.R.A.

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 passing the ARDMS examination(s) use the credentials RDCS, RDMS, RMSKS or RVT. Those passing the ARRT primary examination use the credential R.T.(S) or R.T.(VS). Those passing the CCI examination(s) use the credentials RCCS, RCS, RPhS or RVS.

Those passing 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, respecting confidentiality and established policy.
- Corroborating a patient's clinical history with 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 venipuncture as prescribed by a licensed practitioner.*†
- Postprocessing data.
- Preparing patients for procedures.
- Providing education.
- 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.*

Computed Tomography

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

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.

Radiation Therapy

- Constructing/preparing immobilization, beam directional and beam-modification devices.
- Delivering radiation therapy treatments as prescribed by a radiation oncologist.
- Detecting and reporting significant changes in patients' conditions and determining when to withhold treatment until the radiation oncologist is consulted.
- Monitoring doses to normal tissues within the irradiated volume to ensure tolerance levels are not exceeded.
- Participating in brachytherapy procedures.
- Performing simulation, localization, treatment planning procedures and dosimetric calculations as prescribed by a radiation oncologist.
- Using imaging technologies for the explicit purpose of simulation, treatment planning and treatment delivery as prescribed by a radiation oncologist.

-

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.
- 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.
- Participates in ALARA, patient and personnel safety, risk management and quality management activities.
- 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

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

Computed Tomography

Refer to general criteria.

Medical Dosimetry

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

Radiation Therapy

- Assesses the patient's need for information and reassurance.
- Identifies and/or removes objects that could interfere with prescribed treatment.
- Inspects beam modifying and immobilization devices prior to use.
- Monitors and assesses patients throughout the treatment course and follow-up visits.
- Monitors doses to normal tissues.
- Monitors side effects and reactions to treatment.
- Monitors treatment unit operation during use.
- Recognizes the patient's need for referral to other care providers, such as a social worker, nurse or dietitian.
- Reviews beam shaping devices prior to treatment delivery.
- Reviews treatment protocol criteria and assesses conditions affecting treatment delivery.
- Reviews treatment record prior to treatment or simulation.

Standard Two – Analysis/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

- Consults appropriate medical personnel to determine a modified 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.
- 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 revises the action plan.
- Selects the most appropriate and efficient action plan after reviewing all pertinent data and assessing the patient's abilities and condition.

Specific Criteria

Computed Tomography

- Reviews the patient's medical record and the licensed practitioner's request to determine optimal scanning protocol for clinical indication.

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

Medical Dosimetry

- Gathers and analyzes pertinent data relevant to the treatment planning and delivery process.
- Participates in reviewing patient treatment parameters and dose records to ensure treatment does not exceed the prescribed dose or normal tissue tolerances.
- Recommends the appropriate immobilization devices and positioning aids for simulation and treatment.
- Recommends when to hold treatment until a radiation oncologist is notified.
- Reviews the treatment record and verifies calculations before and/or after treatment delivery.
- Verifies the treatment summary and the mathematical accuracy of the prescription.

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 procedure changes.
- Reviews treatment record, calculations and/or treatment plan for accuracy prior to treatment delivery.
- Reviews verification images prior to treatment.
- Verifies the mathematical accuracy of the prescription and the daily treatment summary.
- Verifies treatment planning and machine quality assurance has been performed prior to each treatment.

Standard Three – Education

The medical imaging and radiation therapy professional provides information about the procedure and related health issues according to protocol; informs the patient, public and other health care providers about procedures, equipment and facilities; and acquires and maintains current knowledge in practice.

Rationale
Education and communication are necessary to establish a positive relationship and promote safe practices. Advancements in the profession and optimal patient care require additional knowledge and skills through education.

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.
- 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.*†
- Maintains credentials and certification related to practice.
- Provides accurate explanations and instructions at an appropriate time and at a level the patient and their care providers can understand; addresses questions and concerns regarding the procedure.
- Provides information on certification or accreditation to the patient, other health care providers and the public.
- Provides information to patients, health care providers, students and the public concerning the role and responsibilities of individuals in the profession.
- Provides pre-, peri- and post-procedure education.
- Refers questions about diagnosis, treatment or prognosis to a licensed practitioner.

Specific Criteria

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

Computed Tomography

- Maintains knowledge of the most current practices and technology used to minimize patient dose while producing diagnostic quality images.

Medical Dosimetry

- Explains the role and function of the medical dosimetrist in the overall treatment course.
- Reviews the treatment plan with the patient as requested by a radiation oncologist.

Radiation Therapy

- Anticipates a patient's need for information and provides it throughout the treatment course.
- Instructs other health care providers about radiation protection procedures.
- Instructs patient in the maintenance of treatment markings.
- Provides information and instruction on proper skin care, diet and self-care procedures.

Standard Four – Performance

The medical imaging and radiation therapy professional performs the action plan and quality assurance activities.

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 is immediately available to ensure proper diagnosis and treatment of adverse events.*†
- Administers first aid or provides life support.†
- Applies principles of aseptic technique.†
- Assesses and monitors the patient's physical, emotional and mental status.
- Consults with medical physicist or engineer in performing and documenting quality assurance tests.
- 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.
- Monitors the patient for reactions to medications. *†
- Participates in 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.
- Uses accessory equipment.
- Uses an integrated team approach.
- When appropriate, uses personnel radiation monitoring device(s) as indicated by the radiation safety officer or designee.
- Works aseptically in the appropriate environment while preparing, compounding and dispensing sterile and nonsterile medication.*†

Specific Criteria

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

Computed Tomography

- 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 electrocardiogram (ECG) electrodes and correctly identifies ECG wave trigger.
- Optimizes technical factors to minimize radiation exposure to the patient while maintaining diagnostic image quality.
- Uses radiation shielding devices.

Medical Dosimetry

- Adheres to established best practice protocols, guidelines and radiation oncologist directives.
- Calculates treatment unit parameters and doses to treatment volumes and points of interest.
- Collaborates with the radiation therapist and medical physicist to fabricate individualized immobilization, custom blocks and other beam-modifying devices.
- Collaborates with the radiation therapist, medical physicist and radiation oncologist regarding the simulation process and procedures.
- Demonstrates safe handling, storing and disposal of brachytherapy sources.
- Develops a manual or computer-generated brachytherapy treatment plan as prescribed by a radiation oncologist.
- Develops a treatment plan as prescribed by a radiation oncologist.
- Ensures an independent machine-setting check is completed before treatment is delivered.
- Makes the recommendation to discontinue patient treatment until equipment is operating properly.
- Prepares and positions the patient for simulation and treatment using appropriate positioning aids and immobilization devices.
- Prepares or assists in preparing brachytherapy sources and equipment.
- Reviews simulation images with the radiation therapist, medical physicist and radiation oncologist.
- Reviews treatment planning data for accuracy and appropriateness prior to input into the patient's treatment record and initial treatment.

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 preparing 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.

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.
- 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 assurance testing conditions and results.

Specific Criteria

Computed Tomography

Refer to general criteria.

Medical Dosimetry

- Acquires data necessary to perform accurate patient protocol plans and participates in implementation of the plan.
- Ensures treatment parameters have been transferred correctly to the oncology information system.
- Reviews treatment calculations and ensures the validity of the treatment plan.
- Reviews treatment variances and assists in determining possible causes and solutions.

Radiation Therapy

- Checks treatment calculations and/or treatment plan.
- Compares verification images to simulation images using anatomical landmarks or fiducial markers.
- Evaluates the patient daily for any side effects, reactions and therapeutic responses.
- Performs treatment chart checks.
- Reviews treatment discrepancies, determines causes and assists with the action plan.

- Reviews verification images for quality and accuracy.
- Verifies the accuracy of the patient setup prior to treatment delivery.
- Verifies treatment console readouts and settings prior to initiating treatment and upon termination of treatment.

Standard Six – Implementation

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

Rationale
It may be necessary to make changes to the action plan based on quality assurance results 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 the revised action plan.
- Notifies the appropriate health care provider when immediate clinical response is necessary, based on procedural findings and patient condition.
- Obtains assistance to support the quality assurance action plan.
- Takes action based on patient and procedural variances.

Specific Criteria

Computed Tomography

Refer to general criteria.

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.

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.

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.
- Determines that actual outcomes are within established criteria.
- 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.
- 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

Computed Tomography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Radiation Therapy

- Monitors patient status during procedures, throughout the treatment course and for follow-up care.

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 individual(s) 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.

Specific Criteria

Computed Tomography

- Documents the use of shielding devices and proper radiation safety practices.

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

Medical Dosimetry

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

Radiation Therapy

- Documents radiation exposure parameters.
- Maintains imaging and treatment records according to institutional policy.
- Reports any treatment discrepancies to appropriate personnel in accordance with departmental, institutional and regulatory requirements.

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

Computed Tomography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Radiation Therapy

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

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

Computed Tomography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Radiation Therapy

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 instructs others about radiation safety.
- Promotes understanding of the profession.
- Shares knowledge and expertise with others.

Specific Criteria

Computed Tomography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Radiation Therapy

Refer to general criteria.

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 agencies.
- Adheres to the established practice standards of the profession.
- Delivers patient care and service free from bias or discrimination.
- Provides health care services with consideration for a diverse patient population.
- Reports unsafe practices to the radiation safety officer, regulatory agency or other appropriate authority.
- Respects the patient's right to privacy and confidentiality.

Specific Criteria

Computed Tomography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Radiation Therapy

Refer to general criteria.

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 such as research, scientific investigation, presentation and publication advance the profession.

The medical imaging and radiation therapy professional:

General Criteria

- Adopts new best practices.
- Investigates innovative methods for application in practice.
- Monitors changes to federal and state law, regulations and accreditation standards affecting area(s) of practice.
- 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

Computed Tomography

Refer to general criteria.

Medical Dosimetry

Refer to general criteria.

Radiation Therapy

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 federal and state laws, regulations, established standards of practice and facility policies and procedures.

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

Each medical imaging and radiation therapy professional must exercise prudent judgment when determining whether the performance of a given act is within the scope of practice for which the individual is licensed, if applicable within the jurisdiction in which the person is employed, educationally prepared and clinically competent to perform.

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 federal or state law and/or institutional policy permits that:

Medical imaging and radiation therapy professionals can access and/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, 2018)
- Magnetic Resonance Curriculum (ASRT, 2020)
- Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2015 Amended April 2020)
- Radiography Curriculum (ASRT, 2017)
- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications

- Components of Preparedness (NMTCB, 2020)
- Computed Tomography (ARRT, 2017)
- Positron Emission Tomography (PET) Specialty Examination Content Outline (NMTCB, 2016)
- Vascular Interventional Radiography (ARRT, 2017)

QUALITY OF EVIDENCE: High

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

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 and/or administering medications as prescribed by a licensed practitioner.*†

QUALITY OF EVIDENCE: High

Federal and State Statute References
Not applicable

Other
Not applicable

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 Contrast Media. *ACR Manual on Contrast Media.* American College of Radiology; 2020. Accessed September 4, 2020.
- American College of Radiology. ACR practice parameter for performing and interpreting diagnostic computed tomography (CT). Revised 2017. Accessed November 30, 2018.
- American College of Radiology. ACR practice parameter for performing and interpreting magnetic resonance imaging (MRI). Revised 2017. Accessed November 30, 2018.
- American College of Radiology. ACR-SPR practice parameter for the use of intravascular contrast media. Revised 2017. Accessed November 30, 2018.
- 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 (JRC-DMS, 2016)
- Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2015 Amended April 2020)
- Radiation Therapy Curriculum (ASRT, 2019)

* Excludes limited x-ray machine operator

† Excludes medical dosimetry

- Radiography Curriculum (ASRT, 2017)
- Radiologist Assistant Curriculum (ASRT, 2020)

QUALITY OF EVIDENCE: High

Certification Agency Content Specifications
- Components of Preparedness (NMTCB, 2020)
- Computed Tomography (ARRT, 2017)
- Examination Overview: Registered Cardiovascular Invasive Specialist (CCI, 2019)
- Magnetic Resonance Imaging (ARRT, 2020)
- Nuclear Medicine Technology (ARRT, 2017)
- Radiography (ARRT, 2017)
- Registered Radiologist Assistant (ARRT, 2018)
- Vascular-Interventional Radiography (ARRT, 2017)

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 and/or administering medications as prescribed by a licensed practitioner.*†
  - Performing venipuncture as prescribed by a licensed practitioner.*†
  - Starting, maintaining and/or removing intravenous access 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

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.

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. Accessed November 30, 2018.
- 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.* 8th ed. Elsevier; 2018:75-92.

QUALITY OF EVIDENCE: High

Curricula

- Bone Densitometry Curriculum (ASRT, 2019)
- Limited X-ray Machine Operator Curriculum (ASRT, 2020)
- Nuclear Medicine Technology Competency-Based Curriculum Guide (SNMMI, 2015 Amended April 2020)
- Radiation Therapy Curriculum (ASRT, 2019)
- Radiography Curriculum (ASRT, 2017)
- Radiologist Assistant Curriculum (ASRT, 2020)

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, 2018)
- Nuclear Medicine Technology (ARRT, 2017)
- Radiation Therapy (ARRT, 2017)
- Radiography (ARRT, 2017)
- Registered Radiologist Assistant (ARRT, 2018)
- Vascular-Interventional Radiography (ARRT, 2017)

QUALITY OF EVIDENCE: High

Scopes of Practice and Practice Standards Reference
Not applicable

Federal and State Statute References
- § 19.12 Instruction to Workers (NRC, 2018)
- § 20.1208 Dose Equivalent to an Embryo/Fetus (NRC, 2018)
- § 20.1502 Conditions Requiring Individual Monitoring of External and Internal Occupational Dose (NRC, 2018)
- Regulatory Guide 8.34: Monitoring Criteria and Methods to Calculate Occupational Radiation Doses (NRC, 1992)
- Regulatory Guide 8.36: Radiation Dose to the Embryo/Fetus (NRC, 2018)
- Regulatory Guide 8.7: Instructions for Recording and Reporting Occupational Radiation Exposure Data (NRC, 2016)

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

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 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

See glossary.

Evidentiary Documentation

Current Literature

- American College of Radiology. ACR-AAPM-SIIM-SPR practice parameter for digital radiography. Revised 2017.
- 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*. 3rd ed. Charles C Thomas; 2018.
- Carter C, Vealé B. *Digital Radiography and PACS*. 3rd ed. Elsevier; 2019.
- 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*. 5th ed. Elsevier; 2017.
- 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, 2017)

Certification Agency Content Specifications

- Limited Scope of Practice in Radiography (ARRT, 2018)
- Radiography (ARRT, 2017)

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
  - Participates in ALARA, patient and personnel safety, risk management and quality management activities. (Standard One, General Criteria)
  - Employs professional judgment to adapt procedures to improve diagnostic quality or therapeutic outcomes. (Standard Two, General Criteria)
  - Analyzes images to determine the use of appropriate imaging parameters. (Standard Two, limited x-ray machine operator and radiography only)

- 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 Two, limited x-ray machine operator and radiography only)
- Adheres to radiation safety rules and standards. (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)
- Adheres to the established practice standards of the profession. (Standard Twelve, General Criteria)

QUALITY OF EVIDENCE: High

Federal and State Statute 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

advanced-practice radiographer – A registered technologist who has gained additional knowledge and skills through the successful completion of an organized program or radiologic technology education that prepares radiologic technologists for advanced-practice roles and has been recognized by the national certification organization to engage in advanced-practice radiologic technology.

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

ALARA – Acronym for "as low as (is) reasonably achievable," which means 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, 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 and other societal and socioeconomic considerations, and in relation to the use of nuclear energy and licensed materials in the public interest. The ASRT recognizes the concept of ALARA to include energies used for magnetic resonance and sonographic imaging.

anatomic (anatomical) landmarks – Bones or other identifiable points that are visible or palpable and indicate the position of internal anatomy.

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

artifact – Extraneous information on the image that interferes with or distracts from image quality.

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(s) (isotopic or electronic) inside or immediately adjacent to a tumor-bearing region.

CCI – Cardiovascular Credentialing International

change management – Systematic approach to preparing for, implementing and sustaining a change in process.

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.

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

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

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

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.

FDA – U.S. Food and Drug Administration.

fiducial markers – Fixed reference points against which other objects can be measured. They may be placed internally, at skin surface or fixed externally to the patient.

GRADE – Grading of Recommendations Assessment, Development and Evaluation

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.

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 (anxiolysis) – 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

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 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.

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, 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.

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).

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

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

sentinel event – An unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function. The phrase "or the risk thereof" includes any process variation for which a recurrence would carry a significant chance of a serious adverse outcome.

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

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.

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.

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.

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

tolerance levels (doses) – 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.