NATIONAL COMPETENCY PROFILE FOR ENTRY-LEVEL MRTS IN CANADA

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I. Introduction

The *National Competency Profile for Entry-Level Medical Radiation Technologists (MRTs) in Canada* describes the practice requirements of MRTs at entry-to-practice, to provide safe, effective, compassionate and ethical patient care in a variety of work environments.

The following medical radiation technology (MRT) practice areas are included in this profile: Magnetic Resonance, Nuclear Medicine, Radiological Technology, and Radiation Therapy. Companion resources are used in conjunction with the profile to provide further guidance and details to support the competencies outlined within the profile.

The Entry-Level MRT

Entry-level MRTs are at the point of certification for entry-to-practice, directly following completion of a Canadian accredited MRT education program. This competency profile, in forming the basis of both the certification examination and the education received in Canadian accredited education programs, delineates the competencies expected of an entry-level MRT.

At entry-level, an MRT is academically and clinically prepared to contribute productively as a member of the healthcare team. When presented with routine situations, the entry-level MRT performs relevant competencies in a manner consistent with accepted standards of the profession and within a reasonable timeframe.

The entry-level MRT uses professional judgement and critical thinking to reach decisions, anticipating outcomes and responding appropriately, using the best information and evidence available to adapt to individual patient needs and varying contexts of practice. Working autonomously in their area of responsibility, the entry-level MRT understands their own limitations and when to seek appropriate consultation. The entry-level MRT is self-aware, takes initiative and can identify and appraise relevant resources to help inform and build their practice. Using effective communication and collaboration with other members of the healthcare team, entry-level MRTs provide quality patient and family-centered care.

With time and experience, it is recognized that an entry-level MRT will progress to higher levels of proficiency across the competency areas. As lifelong learners, each MRT assumes responsibility for their continued competence and pursuit of professional growth and knowledge.

Purpose of the Competency Profile

The competency profile establishes a standard for entry to the profession, and a foundation upon which to build additional competencies, efficiency and higher levels of practice.

The competency profile will be of value to users both within and outside the profession; however, the primary uses are to:

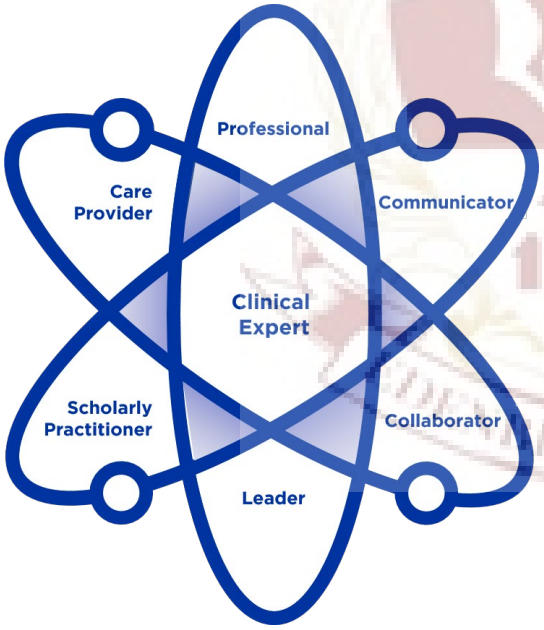
- develop a blueprint for the CAMRT certification examinations
- provide a guide for the curriculum of accredited education programs
- provide a standard for the accreditation of education programs.

Additionally, students may use the profile as a tool to help benchmark and reflect on their learning progress.

Competency Profile Framework

The competency profile is modeled on the Can-MEDS educational framework. In this framework, MRT competencies are grouped thematically in seven distinct roles. With the overarching goal of improving quality of care, this framework links the required competencies to the roles MRTs play in patient care and service delivery, highlighting the contributions MRTs make within the larger health-care environment.

All four disciplines share the same competencies under the Professional, Communicator, Collaborator, Scholarly Practitioner and Leader roles and most of the competencies under the Care Provider role. Each specialty area has a unique set of competencies under the Clinical Expert role and specialty-specific companion resources, which provide additional details to support the competencies. The roles are described as follows:



Adapted from: Frank JR, Snell L, Sherbino J, editors. *CanMEDS 2015 Physician Competency Framework*. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015

Professional - MRTs are committed to providing the highest standard of patient-centered care by acting with professional integrity in accordance with ethical and legal responsibilities. MRTs take responsibility for their personal wellness and performance. The elements and values of professionalism form a fundamental foundation for MRT practice, directing decision-making and actions, and shaping how the profession is perceived.

Communicator - MRTs use effective communication with patients, their families, members of the healthcare team and other stakeholders to contribute to quality patient care. Communication with patients and their families is a vital component of the MRT role. As a primary point of contact for patients on their healthcare journey, MRTs provide education about the procedures and treatments to be performed and answer questions to increase understanding and alleviate anxiety and stress.

Collaborator - MRTs work closely with other healthcare professionals to provide quality diagnostic and therapeutic services to patients. MRTs are respected and essential members of the interprofessional team and recognize and respect the role of all involved in the collaborative process whose aim is to ensure optimal outcomes for patients.

Care Provider - MRTs use their knowledge, skills and judgement in the provision of high-quality patient and family-centered care. Direct contact with patients in the clinical setting allows MRTs the opportunity to confirm and anticipate the needs of patients and their families and autonomously adapt their practice within accepted standards to deliver safe, quality care. MRTs practice with empathy and are committed to ensuring all patients are treated with dignity, equality and respect.

Leader - MRTs act as leaders, individually or as partners in the healthcare system. They take initiative, and through their actions as mentors, advocates, stewards and facilitators, they contribute to ongoing efforts to improve outcomes and quality of care for patients.

Scholarly Practitioner - MRTs commit to professional inquiry, leading to the creation, application, dissemination and translation of evidence-informed practice. MRTs critically appraise information integrating best evidence into practice. They use, share, and where possible, contribute to the MRT body of knowledge through research activities and scholarly practice. As lifelong learners, MRTs assume responsibility for their continued competence and support others in their pursuit of professional growth and knowledge.

Clinical Expert - MRTs use their expert knowledge of medical imaging and/or radiation therapy equipment, procedures and practices to deliver quality outcomes for patients. In medical imaging, this relates to the acquisition of quality images; whereas in radiation therapy, the focus is directed at planning and delivering optimal ionizing radiation for therapeutic purposes. Throughout, MRTs ensure the care provided is safe, appropriate, evidence-informed, and tailored to individual patient needs. Each MRT specialty uses sophisticated equipment relevant to their role; adapting to new technology as required by evolving practice.

Assumptions

A number of overarching assumptions apply to all competencies described in the competency profile:

1. The competencies are interdependent, each competency informing and qualifying other competencies. Competencies are not intended to be applied in isolation.
2. The number of competencies and the order of competencies is not an indication of priority or importance.
3. The competencies should be considered as an array of abilities that the MRT brings to the workplace.
4. The MRT performs appropriate competencies in a manner consistent with the situation at hand, while complying with organizational directives. The competencies are not intended to be applied in the sequence listed, nor should they be considered a protocol.
5. Performance of a competency requires the application of learning, which may involve the cognitive domain (knowledge and thinking skills), the affective domain (attitudes and values) and the psychomotor domain (manual skills).
6. The competency profile defines the key learning outcomes that should be the product of accredited education programs. They do not constitute a complete educational curriculum nor do they define a learning process; these should be developed by appropriately qualified program personnel.
7. The profile is intended to set a meaningful national standard for each MRT discipline without being overly prescriptive. It provides a guide for curriculum development. Curriculum should incorporate the expectations stated in the definition of entry-level proficiency.

Each role in the profile comprises a list of key competencies (the essential knowledge, skills and/or judgement required of an MRT at entry-to-practice), and each key competency is expressed in terms of one or more enabling competencies, which outline the relevant knowledge and skills that contribute to the achievement of the key competency.

While these roles are presented as discrete entities, the associated competencies should not be performed in isolation. It is recognized that the roles are interdependent, and integration and application of the knowledge and skills associated with all roles is essential to safe and competent practice.

II. Context of Practice

MRT Practice

Magnetic Resonance, Nuclear Medicine, Radiological Technology and Radiation Therapy are the four MRT practice areas. MRTs are the essential link between compassionate care and the most sophisticated imaging and therapeutic technologies, contributing their expertise to the diagnosis and treatment of millions of patients each year.

Contexts of Practice

MRTs function as part of the interprofessional team in a variety of practice settings and with diverse patient populations (e.g. variations in age, sex, gender, sexual orientation, race, national/ethic origin, socioeconomic status, level of health, etc.) when delivering patient-centered care. Exposure to a variety of practice settings and patient populations is an essential component of MRT competency development for entry-to-practice.

	Examples			
	Practice environments	Practice Settings*	Patient Populations	Interprofessional team**
Magnetic Resonance	Hospitals, community-based clinics, academic institutions	Ambulatory care, acute care, emergency	Patients represent a broad range of clinical indications (e.g.: oncology, cardiology, neurology, musculoskeletal) and varying diagnoses	Radiologist, medical physicists, diagnostic imaging nurse and other specialty physicians
Nuclear Medicine	Hospitals, community-based clinics, academic institutions	Ambulatory care, acute care, emergency, general NM, PET/CT, radiopharmacies, CT, bone mineral densitometry	Patients represent a broad range of clinical indications (e.g.: oncology, cardiology, neurology, skeletal, gastrointestinal) and varying diagnoses	Radiologist, nuclear medicine physician, radiopharmacist, medical physicists, diagnostic imaging nurse and other specialty physicians
Radiological Technology	Hospitals, community-based clinics, academic institutions	Ambulatory care, acute care, emergency, general radiography, operating rooms, CT, mammography, interventional radiology, bone mineral densitometry	Patients represent a broad range of clinical indications (e.g.: skeletal, gastrointestinal, genitourinary) and varying diagnoses.	Radiologist, medical physicists, diagnostic imaging nurse and other specialty physicians

Radiation Therapy	Cancer centres, academic institutions	Pre-treatment (simulation & dosimetry) Treatment delivery (external beam, brachytherapy)	While caring primarily for oncology patients, these patients represent a broad range of cancer types and varying diagnoses	Radiation oncologists, medical physicists, oncology nurses and other specialty physicians

**Practice settings - These are intended as examples and can vary based on provincial regulations and employer requirements.*

*** The examples listed are those professionals that MRTs have regular contact with. This does not exclude other professionals with whom the MRT may interact.*

III. Development and Updating of the Competency Profile

Updating

Re-validation of the competency profiles takes place approximately every five years. This involves an initial critical review by an expert committee, followed by consultation with regulators, education programs, practitioners and service department heads / managers.

Development

The 2019 version of the *National Competency Profile for Entry-Level Medical Radiation Technologists in Canada* is the culmination of hundreds of hours of time and effort put forth by stakeholders from across Canada. The framework for this new profile is a product of the 2015 Future of MRT Education Symposium and the subsequent research and consultation that followed the meeting.

Prior to drafting the revised competency profile, a survey was administered to key stakeholders to solicit feedback on the content and completeness of the current entry-level competency profiles (dated 2014). This data, along with data from the Future of MRT Education Symposium, informed the development of the draft profile.

Development of the revised competency framework and profile was led by the Competency Profile Revision Steering Committee and a Senior Psychometrician from Yardstick Assessment Strategies. Content expertise was provided by a dedicated group of subject matter experts from each MRT discipline, with representation from across the country and a variety of practice settings. Key stakeholders were consulted throughout the process, including: regulators, accredited education programs, practitioners, new graduates, employers and senior healthcare administrators.

Those familiar with the 2014 competency profiles will note three important changes to the structural framework used to organize the competencies.

1. **Transition from Modules to Roles**

   Whereas the competencies in the 2014 profile were organized into five modules (Professional Practice, Patient Management, Health and Safety, Operation of Equipment, Procedure Management), the competencies in this profile are organized into seven roles: Professional, Communicator, Collaborator, Care Provider, Scholarly Practitioner, Leader and Clinical Expert (see Profile Framework below).

2. **Transition from four Competency Profiles to one Competency Profile**

   Whereas each discipline had a separate competency profile in 2014, the 2019 competency profile combines all four disciplines into one united competency profile for the MRT profession. All four disciplines share the same competencies under the Professional, Communicator, Collaborator, Scholarly Practitioner and Leader roles and most of the competencies under the Care Provider role. Each discipline has a unique set of competencies under the Clinical Expert role. This profile aims to highlight the commonalities between the four disciplines while also honouring the unique skill set each discipline brings to MRT practice.

3. **Removal of Assessment Environments**

   All competencies must be achieved and assessed in either an academic, simulated or clinical environment through an accredited education program. It is expected that, wherever possible, the competencies included in this profile are assessed in the clinical environment except for those competencies that are clearly academic in nature (e.g., "Describe fundamentals..."). However, it is realized, based on many variable factors (e.g., exam frequency, regional/facility differences), that assessment of all competencies in the clinical environment may not always be feasible. For accreditation purposes, the education program should document any cases where competence cannot be verified clinically. It is the responsibility of the education program to ensure, through assessment of competencies, the graduate technologist is competent to practice safely and effectively at an entry-to-practice level in the current healthcare environment.

IV. Acknowledgements

The creation of the *National Competency Profile for Entry-Level Medical Radiation Technologists in Canada* was possible due to the time, effort and expertise of a dedicated group of key stakeholders from across the country.

Competency Profile Steering Committee

Name	Designation	Province	Position
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- The Exam Validation Committees.
- The staff at the CAMRT office.

We would also like to extend our sincere gratitude to the practitioners, MRT regulators, educators and employers who contributed to the validation of the competency profile through survey participation.

V. Medical Radiation Technologist Roles

1 PROFESSIONAL

MRTs are committed to providing the highest standard of patient-centered care by acting with professional integrity in accordance with ethical and legal responsibilities. MRTs take responsibility for their personal wellness and performance. The elements and values of professionalism form a fundamental foundation for MRT practice, directing decision-making and actions, and shaping how the profession is perceived.

	Key Competency		Enabling Competencies
1.1	Adhere to legal and regulatory requirements.	1.1.1	Practice within provincial scope of practice.
		1.1.2	Comply with federal and provincial legislation and regulations.
		1.1.3	Comply with requirements of provincial regulatory body, including applicable Standards of Practice and sexual abuse prevention guidelines.
		1.1.4	Maintain privacy and confidentiality in accordance with legislation.
		1.1.5	Ensure ongoing informed consent to procedures.
1.2	Apply ethical principles.	1.2.1	Practice within provincial regulatory or national association code of ethics.
		1.2.2	Practice within limits of professional knowledge, skills and judgement.
		1.2.3	Respect the dignity, privacy and autonomy of the patient.
		1.2.4	Maintain professional boundaries.
1.3	Demonstrate professional integrity.	1.3.1	Practice within organizational policies and directives.
		1.3.2	Respond professionally to changes impacting the practice environment.
		1.3.3	Use professional judgement and critical thinking to reach decisions.
		1.3.4	Demonstrate accountability for decisions, actions, and outcomes.
1.4	Recognize the importance of personal health and wellness for safe practice.	1.4.1	Use techniques to manage personal stress in the workplace.
		1.4.2	Employ strategies that promote work-life balance to support personal health and sustainable practice.

1.5	**Demonstrate social responsibility and cultural awareness.**	1.5.1	Provide care in an unbiased manner.
		1.5.2	Demonstrate sensitivity to the diversity of individuals.
		1.5.3	Provide care in a culturally safe manner.
		1.5.4	Respect and acknowledge the diverse personal histories of First Nations, Inuit and Métis peoples.

2 COMMUNICATOR

MRTs use effective communication with patients, their families, members of the healthcare team and other stakeholders to contribute to quality patient care. Communication with patients and their families is a vital component of the MRT role. As a primary point of contact for patients on their healthcare journey, MRTs provide education about the procedures and treatments to be performed and answer questions to increase understanding and alleviate anxiety and stress.

Key Competency		Enabling Competencies	
2.1	**Establish and maintain effective communication.**	2.1.1	Establish trust with patients and their families.
		2.1.2	Use effective written communication skills.
		2.1.3	Use effective verbal and non-verbal communication skills.
		2.1.4	Use effective interpersonal skills.
		2.1.5	Explain complex and technical matters related to medical radiation technology to the level of the respondent's understanding.
		2.1.6	Provide appropriate information about procedures to patients and support persons and verify understanding.
		2.1.7	Adapt communication strategies to enhance interaction with patients and support persons.
		2.1.8	Respond to questions from patients and support persons or direct them to appropriate resources.
		2.1.9	Seek and respond professionally to feedback from others.
2.2	**Obtain, evaluate and share information.**	2.2.1	Obtain information from patients or support persons.
		2.2.2	Identify clinically relevant details and respond.
		2.2.3	Provide accurate and timely updates to the care team, as appropriate.
		2.2.4	Maintain accurate and complete written and electronic documentation.
		2.2.5	Advise patients of necessary pre- and post-procedure care instructions.

3 COLLABORATOR

MRTs work closely with other healthcare professionals to provide quality diagnostic and therapeutic services to patients. MRTs are respected and essential members of the interprofessional team and recognize and respect the role of all involved in the collaborative process whose aim is to ensure optimal outcomes for patients.

Key Competency		Enabling Competencies	
3.1	**Employ effective team processes to coordinate patient care.**	3.1.1	Demonstrate understanding of the roles of healthcare team members.
		3.1.2	Share MRT expertise with other healthcare professionals.
		3.1.3	Actively contribute as an interprofessional/ intraprofessional team member.
		3.1.4	Demonstrate respect for differing perspectives.
		3.1.5	Ensure appropriate transfer of care.
3.2	**Manage conflict in collaboration with others.**	3.2.1	Use conflict management techniques.

4 CARE PROVIDER

MRTs use their knowledge, skills and judgement in the provision of high quality patient and family-centered care. Direct contact with patients in the clinical setting allows MRTs the opportunity to confirm and anticipate the needs of patients and their families and autonomously adapt their practice within accepted standards to deliver safe, quality care. MRTs practice with empathy and are committed to ensuring all patients are treated with dignity, equality and respect.

Key Competency		Enabling Competencies	
4.1	**Practice in a manner that contributes to safe care.**	4.1.1	Verify patient identity.
		4.1.2	Transport and transfer patients safely.
		4.1.3	Use immobilization devices, as appropriate.
		4.1.4	Ensure proper function of assistive devices and equipment provided by the facility.
		4.1.5	Recognize and respond to medical emergencies.
4.2	**Conduct relevant patient assessment in partnership with patients and families.**	4.2.1	Review clinical history provided relative to ordered procedure and address discrepancies.
		4.2.2	Verify appropriateness of the procedure.
		4.2.3	Assess patient for contraindications to procedure and respond.
		4.2.4	Assess and respond to patient condition.
4.3	**Provide compassionate care for patient's physiological, cognitive and psychological needs.**	4.3.1	Monitor patient throughout procedure and respond as necessary.
		4.3.2	Adapt positioning and/or protocol in response to patient condition and clinical environment.
		4.3.3	Enhance patient comfort.
		4.3.4	Provide patient interventions, as appropriate.
		4.3.5	Recognize and adapt to individual patient needs.
4.4	**Comply with appropriate infection prevention and control standards and/or regulations.**	4.4.1	Employ routine practices and additional precautions for infection prevention and control.
		4.4.2	Employ appropriate procedure for patients with compromised immunity.
		4.4.3	Apply standardized procedures for handling and disposing of sharps, and contaminated and biohazardous materials.

4.5	**Provide education and support to patients and families/support persons.**	4.5.1	Provide education related to procedure, risks and safe practices.
		4.5.2	Provide an open and secure environment in which the patient can confide.
		4.5.3	Provide education regarding management of expected treatment/procedure side effects.
		4.5.4	Provide education on health and nutrition. *
		4.5.5	Develop and implement individualized patient care plan.*
		4.5.6	Refer patient to supportive services, where appropriate. *
		4.5.7	Respond to inquiries on complementary and alternative medicine.*
		4.5.8	Adjust patient's care using accepted assessment methods. *

** These competencies are specific to Radiation Therapy (RTT).*

5 LEADER

MRTs act as leaders, individually or as partners in the healthcare system. They take initiative and through their actions as mentors, advocates, stewards and facilitators, they contribute to ongoing efforts to improve outcomes and quality of care for patients.

Key Competency		Enabling Competencies	
5.1	**Mentor learners/colleagues/ peers.**	5.1.1	Foster professional growth in others by providing guidance and constructive feedback.
5.2	**Advocate for patients, the profession and the healthcare system.**	5.2.1	Identify factors in the clinical environment that may impact delivery of care.
		5.2.2	Recommend evidence-based changes to current practice to improve quality of care.
		5.2.3	Engage in activities to support and/or promote the profession.
		5.2.4	Provide education to personnel and the public regarding risks and safe practices.
5.3	**Demonstrate stewardship of healthcare resources in the care of patients.**	5.3.1	Prioritize workflow to optimize patient care.
		5.3.2	Optimize use of resources.
5.4	**Contribute to quality assurance initiatives.**	5.4.1	Identify and report safety incidents to enhance systems of care.
		5.4.2	Participate in quality improvement processes.

6 SCHOLARLY PRACTITIONER

MRTs commit to professional inquiry, leading to the creation, application, dissemination and translation of evidence-informed practice. MRTs critically appraise information to support the integration of best evidence into practice. They use, share, and where possible, contribute to the MRT body of knowledge through research activities and scholarly practice. As lifelong learners, MRTs assume responsibility for their continued competence and support others in their pursuit of professional growth and knowledge.

Key Competency		Enabling Competencies	
6.1	**Demonstrate self-awareness.**	6.1.1	Engage in reflective practice.
		6.1.2	Formulate questions to solve problems and address gaps in one's own knowledge and practice.
6.2	**Commit to continuous professional learning and dissemination of knowledge.**	6.2.1	Maintain awareness of current and emerging issues and technological developments relevant to the practice of medical radiation technology and the broader healthcare system.
		6.2.2	Seek relevant learning opportunities to enhance knowledge, skills and judgement.
		6.2.3	Facilitate education of students, peers, patients and the public.
6.3	**Engage in scholarly inquiry.**	6.3.1	Contribute to research activities.
		6.3.2	Apply research principles, ethics and methods.
		6.3.3	Critically appraise professional literature to assess relevance to practice.
		6.3.4	Share evidence-informed findings for practice and quality improvement.
		6.3.5	Integrate best evidence into practice through appropriate consultation and approval.

7 CLINICAL EXPERT

MRTs use their expert knowledge of medical imaging and/or radiation therapy equipment, procedures and practices to deliver quality outcomes for patients. In medical imaging, this relates to the acquisition of quality images; whereas in radiation therapy, the focus is directed at planning and delivering optimal ionizing radiation for therapeutic purposes.

Throughout, MRTs ensure the care provided is safe, appropriate, evidence-informed, and tailored to individual patient needs.

Each MRT specialty uses sophisticated equipment relevant to their role; adapting to new technology as required by evolving practice.

Magnetic Resonance (MR)

Key Competency		Enabling Competencies	
MR.1	**Integrate safe work principles and procedures into practice.**	MR.1.1	Use protective devices, equipment, and apparel.
		MR.1.2	Use proper body mechanics.
		MR.1.3	Ensure a safe working environment.
		MR.1.4	Adapt safety practices according to equipment type.
		MR.1.5	Implement procedure for quench.
		MR.1.6	Recognize and respond to facility emergencies.
		MR.1.7	Implement procedures for screening/safety breach.
		MR.1.8	Provide hearing protection and call bell.
		MR.1.9	Ensure safe practices in radiofrequency coil and equipment cable placement.
MR.2	**Integrate safe screening principles and procedures into practice.**	MR.2.1	Determine suitability of items for admission into MR environment.
		MR.2.2	Determine suitability of implants, devices and other objects in/on patient's body for MR environment.
		MR.2.3	Provide education to all persons entering the MR environment about MR safety.
		MR.2.4	Take appropriate action when safety concerns are identified during screening process.
		MR.2.5	Demonstrate proper documentation of screening process.
MR.3	**Recognize and respond to MR safety hazards.**	MR.3.1	Take appropriate action when hazards of the static magnetic field are identified.
		MR.3.2	Take appropriate action when hazards of the time-varying (gradient) magnetic fields are identified.
		MR.3.3	Take appropriate action when hazards of the radiofrequency field are identified.
		MR.3.4	Explain the appropriate action required when encountering cryogen hazards.
MR.4	**Manage a variety of imaging systems.**	MR.4.1	Apply knowledge of MR physics.
		MR.4.2	Apply principles of MRI equipment.
		MR.4.3	Perform quality control procedures.
		MR.4.4	Use digital networking and archiving systems.
		MR.4.5	Use accessory equipment.
		MR.4.6	Operate imaging systems.

Key Competency		Enabling Competencies	
MR.5	**Integrate clinical principles into practice.**	MR.5.1	Apply knowledge of cross-sectional/relational anatomy and physiology as they relate to clinical procedures.
		MR.5.2	Apply knowledge of pathophysiology as it relates to clinical procedures.
		MR. 5.3	Apply knowledge of other imaging and therapeutic modalities.
		MR.5.4	Describe fundamentals of advanced and emerging techniques/procedures.
MR.6	**Perform diagnostic procedures.**	MR.6.1	Prepare patient.
		MR.6.2	Position patient using anatomical landmarks and knowledge of relational anatomy, to best demonstrate anatomical structures / pathologies.
		MR.6.3	Plan imaging procedure using all relevant clinical data.
		MR.6.4	Optimize radiofrequency coil implementation or practices.
		MR.6.5	Optimize imaging planes.
		MR.6.6	Select and optimize appropriate imaging pulse sequence, parameters and imaging options.
		MR.6.7	Determine limit and extent of coverage.
		MR.6.8	Apply specific absorption rate reduction practices.
		MR.6.9	Verify acquired data are accurate and complete.
MR.7	**Administer substances required for clinical procedures.**	MR.7.1	Perform venipuncture.
		MR.7.2	Prepare pharmaceutical agents.
		MR.7.3	Apply knowledge of the effects of pharmaceutical agents.
		MR.7.4	Administer pharmaceuticals via appropriate route.
		MR.7.5	Prepare contrast agents.
		MR.7.6	Apply knowledge of the effects of contrast agents.
		MR.7.7	Administer contrast agents via appropriate route.
		MR.7.8	Recognize and respond to adverse reactions.
MR.8	**Analyze image and data quality and respond.**	MR.8.1	Determine if further images and/or data are required.
		MR.8.2	Perform post-acquisition processing.
		MR.8.3	Differentiate anatomical structures on images.
		MR.8.4	Evaluate images for normal results and variants.
		MR.8.5	Recognize common pathologies, anomalies, and conditions.
		MR.8.6	Evaluate images for artifacts and respond.
		MR.8.7	Ensure accuracy of markers and annotation.

Nuclear Medicine (NM)

Key Competency		Enabling Competencies	
NM.1	**Integrate safe work principles and procedures into practice.**	NM.1.1	Use protective devices, equipment, and apparel.
		NM.1.2	Use proper body mechanics.
		NM.1.3	Ensure a safe working environment.
		NM.1.4	Adapt safety practices according to equipment type.
		NM.1.5	Apply ALARA principle.
		NM.1.6	Apply knowledge of radiation effects and risks.
		NM.1.7	Monitor personal radiation exposure and respond.
		NM.1.8	Use radiation detection devices.
		NM.1.9	Assess integrity of protective apparel and devices.
		NM.1.10	Recognize and respond to facility emergencies.
NM.2	**Integrate radiation safety principles and procedures into practice.**	NM.2.1	Ship and receive nuclear materials.
		NM.2.2	Manage inventory of nuclear material.
		NM.2.3	Perform radiation monitoring and evaluate results.
		NM.2.4	Perform leak testing for sealed sources.
		NM.2.5	Perform area commissioning and decommissioning.
		NM.2.6	Respond to a radioactive spill.
		NM.2.7	Recognize and respond to radiation emergencies.
NM.3	**Manage a variety of imaging systems.**	NM.3.1	Apply knowledge of radiation physics.
		NM.3.2	Apply knowledge of operational components of imaging systems to optimize images and data.
		NM.3.3	Perform quality control procedures.
		NM.3.4	Use accessory equipment.
		NM.3.5	Recognize and respond to emergencies involving equipment.
		NM.3.6	Use digital networking and archiving systems.
		NM.3.7	Operate imaging systems.

Key Competency		Enabling Competencies	
NM.4	**Perform radiopharmacy and laboratory procedures.**	NM.4.1	Ensure correct storage of radiopharmaceuticals, generators, non-radioactive supplies, and kits.
		NM.4.2	Schedule generator elutions to meet kit requirements and department needs based off of predicted generator yield.
		NM.4.3	Perform generator elution.
		NM.4.4	Perform generator eluate quality control.
		NM.4.5	Perform radiopharmaceutical kit reconstitution.
		NM.4.6	Perform radiopharmaceutical quality control.
		NM.4.7	Radiolabel autologous red blood cells.
		NM.4.8	Radiolabel autologous leukocytes.
		NM.4.9	Dispense radiopharmaceuticals safely and accurately.
		NM.4.10	Prepare standard / stock solutions.
NM.5	**Integrate clinical principles into practice.**	NM.5.1	Apply knowledge of cross-sectional/relational anatomy and physiology as they relate to clinical procedures.
		NM.5.2	Apply knowledge of pathophysiology as it relates to clinical procedures.
		NM.5.3	Apply knowledge of the effects of pharmacologic and dietary agents as they relate to clinical procedures.
		NM.5.4	Apply knowledge of other imaging and therapeutic modalities.
		NM.5.5	Describe fundamentals of advanced and emerging techniques/procedures.
NM.6	**Administer substances required for clinical procedures.**	NM.6.1	Perform venipuncture.
		NM.6.2	Prepare pharmaceutical agents.
		NM.6.3	Apply knowledge of the effects of pharmaceutical agents.
		NM.6.4	Administer pharmaceuticals via appropriate route.
		NM.6.5	Prepare contrast agents.
		NM.6.6	Apply knowledge of the effects of contrast agents.
		NM.6.7	Administer contrast agents via appropriate route.
		NM.6.8	Recognize and respond to adverse reactions.
		NM.6.9	Prepare sterile trays.

Key Competency		Enabling Competencies	
NM.7	**Perform diagnostic and therapeutic procedures.**	NM.7.1	Plan diagnostic procedure using all relevant clinical data.
		NM.7.2	Plan therapy procedure using all relevant clinical data.
		NM.7.3	Prepare patient.
		NM.7.4	Position patient using anatomical landmarks and knowledge of relational anatomy, to best demonstrate anatomical structures / pathologies.
		NM.7.5	Administer, or assist with administration of, required radiopharmaceutical or radiation dose in accordance with protocol.
		NM.7.6	Select and optimize imaging parameters.
		NM.7.7.	Verify acquired data is accurate and complete.
NM.8	**Analyze image and data quality and respond.**	NM.8.1	Apply knowledge of principles affecting image quality.
		NM.8.2	Determine if further images and/or data are required.
		NM.8.3	Perform post-acquisition processing.
		NM.8.4	Differentiate anatomical structures on images.
		NM.8.5	Evaluate images for normal results and variants.
		NM.8.6	Recognize common pathologies, anomalies, and conditions.
		NM.8.7	Evaluate images for artifacts and respond.
		NM.8.8	Ensure accuracy of markers and annotation.

Radiological Technology (RTR)

	Key Competency		Enabling Competencies
RTR.1	**Integrate safe work principles and procedures into practice.**	RTR.1.1	Use protective devices, equipment, and apparel.
		RTR.1.2	Use proper body mechanics.
		RTR.1.3	Ensure a safe working environment.
		RTR.1.4	Adapt safety practices according to equipment type.
		RTR.1.5	Apply ALARA principle.
		RTR.1.6	Apply knowledge of radiation effects and risks.
		RTR.1.7	Monitor personal radiation exposure and respond.
		RTR.1.8	Recognize and respond to facility emergencies.
		RTR.1.9	Assess integrity of protective apparel and devices.
RTR.2	**Manage a variety of imaging systems.**	RTR.2.1	Apply knowledge of radiation physics.
		RTR.2.2	Apply knowledge of the operational components of imaging systems to optimize images and data.
		RTR.2.3	Use accessory equipment.
		RTR.2.4	Operate imaging systems.
		RTR.2.5	Use digital networking and archiving systems.
		RTR.2.6	Recognize and respond to emergencies involving equipment.
		RTR.2.7	Participate in a repeat/reject analysis program.
		RTR.2.8	Assess performance of imaging systems and respond
RTR.3	**Integrate clinical principles into practice.**	RTR.3.1	Apply knowledge of cross-sectional/relational anatomy and physiology as they relate to clinical procedures.
		RTR.3.2	Apply knowledge of pathophysiology as it relates to clinical procedures.
		RTR.3.3	Apply knowledge of imaging procedures and protocols in various clinical environments.
		RTR.3.4	Apply knowledge of other imaging and therapeutic modalities.
		RTR.3.5	Describe fundamentals of advanced and emerging techniques/procedures.

	Key Competency		Enabling Competencies
RTR.4	**Perform diagnostic and therapeutic procedures.**	RTR.4.1	Plan imaging procedure using relevant clinical data.
		RTR.4.2	Prepare patient.
		RTR.4.3	Position patient for imaging procedures using anatomical landmarks and knowledge of relational anatomy.
		RTR.4.4	Align imaging system to demonstrate required anatomical structure(s).
		RTR.4.5	Adapt imaging protocol in response to findings on the image.
		RTR.4.6	Select and optimize imaging parameters.
		RTR.4.7	Perform procedures in operating room and mobile (point of care) environments.
		RTR.4.8.	Verify acquired data is accurate and complete.
RTR.5	**Administer substances required for clinical procedures.**	RTR.5.1	Perform venipuncture.
		RTR.5.2	Prepare pharmaceutical agents.
		RTR.5.3	Apply knowledge of the effects of pharmaceutical agents.
		RTR.5.4	Administer pharmaceuticals via appropriate route.
		RTR.5.5	Prepare contrast agents.
		RTR.5.6	Apply knowledge of the effects of contrast agents.
		RTR.5.7	Administer contrast agents via appropriate route.
		RTR.5.8	Recognize and respond to adverse reactions.
		RTR.5.9	Perform rectal tube insertion.
		RTR.5.10	Prepare sterile trays.
RTR.6	**Analyze image and data quality and respond.**	RTR.6.1	Apply knowledge of principles affecting image quality.
		RTR.6.2	Differentiate anatomical structures on images.
		RTR.6.3	Evaluate images for normal results and variants.
		RTR.6.4	Recognize common pathologies, anomalies, and conditions.
		RTR.6.5	Ensure accuracy of markers and annotation.
		RTR.6.6	Evaluate images for artifacts and respond.
		RTR.6.7	Evaluate technical factors in image quality.
		RTR.6.8	Determine if further images are required.
		RTR.6.9	Perform post-acquisition processing.

Radiation Therapy (RTT)

Key Competency		Enabling Competencies	
RTT.1	**Integrate safe work principles and procedures into practice.**	RTT.1.1	Use protective devices, equipment, and apparel.
		RTT.1.2	Use proper body mechanics.
		RTT.1.3	Ensure a safe working environment.
		RTT.1.4	Adapt safety practices according to equipment type.
		RTT.1.5	Apply ALARA principle.
		RTT.1.6	Apply knowledge of radiation effects and risks.
		RTT.1.7	Monitor personal radiation exposure and respond.
		RTT.1.8	Recognize and respond to radiation emergencies.
		RTR.1.9	Use radiation detection devices.
		RTT.1.10	Recognize and respond to facility emergencies.
RTT.2	**Manage a variety of imaging and treatment systems.**	RTT.2.1	Incorporate knowledge of established radiation therapy modalities.
		RTT.2.2	Conduct quality assurance tests using appropriate equipment.
		RTT.2.3	Operate radiation therapy planning equipment.
		RTT.2.4	Operate radiation therapy treatment equipment.
		RTT.2.5	Describe basic principles of brachytherapy treatment equipment.
		RTT.2.6	Assess and respond to variances in the performance of radiation therapy equipment.
		RTT.2.7	Use digital networking and archiving systems.
RTT.3	**Manage individual care plans.**	RTT.3.1	Conduct weekly quality assurance on individual care plans.
		RTT.3.2	Assess images for pathology and conditions impacting care.
RTT.4	**Develop optimal strategy for radiation therapy pre-treatment procedures.**	RTT.4.1	Determine optimal patient position and immobilization.
		RTT.4.2	Construct and/or use custom immobilization devices.
		RTT.4.3	Determine optimal imaging acquisition parameters.
		RTT.4.4	Appraise results of pre-treatment procedures.
		RTT.4.5	Perform reference-marking procedure to patient and custom immobilization devices.

Key Competency		Enabling Competencies	
RTT.5	**Design optimal radiation therapy plans.**	RTT.5.1	Perform multi-modality image fusion as required.
		RTT.5.2	Verify appropriate delineation of target volumes.
		RTT.5.3	Validate dose and fractionation based on radiobiological and clinical oncology principles.
		RTT.5.4	Contour appropriate structures.
		RTT.5.5	Create beam arrangements consistent with dose-limiting practices and equipment limitations.
		RTT.5.6	Apply protocol requirements for clinical trials as required.
		RTT.5.7	Employ beam-modification devices and techniques in order to optimize distribution.
		RTT.5.8	Perform manual calculations for treatment procedures.
		RTT.5.9	Produce beam modification devices.
		RTT.5.10	Modify plan during treatment course as required.
		RTT.5.11	Evaluate dosimetric treatment plans.
		RTT.5.12	Appraise treatment plans for brachytherapy.
RTT.6	**Deliver prescribed radiation therapy.**	RTT.6.1	Confirm readiness for treatment.
		RTT.6.2	Reproduce planned patient treatment position.
		RTT.6.3	Select appropriate imaging for procedure.
		RTT.6.4	Prepare imaging devices.
		RTT.6.5	Acquire images.
		RTT.6.6	Assess optimized images for patient position, isocenter localization, and volume match.
		RTT.6.7	Make treatment decisions based on results of image assessment and protocols.
		RTT.6.8	Employ motion management procedures and devices as required.
		RTT.6.9	Justify the decision to implement treatment.
		RTT.6.10	Administer prescribed radiation therapy.
		RTT.6.11	Justify appropriate treatment for malignant, non-malignant, and benign conditions.

Key Competency		Enabling Competencies	
RTT.7	**Integrate clinical principles into practice.**	RTT.7.1	Apply knowledge of clinical oncology concepts to diseases and conditions.
		RTT.7.2	Apply knowledge of the effects of pharmacologic agents as they relate to therapeutic procedures.
		RTT.7.3	Apply knowledge of cross-sectional/relational anatomy and physiology as they relate to clinical procedures.
		RTT.7.4	Apply knowledge of pathophysiology as it relates to clinical procedures.
		RTT.7.5	Apply knowledge of radiobiology.
		RTT.7.6	Apply knowledge of radiation physics.
		RTT.7.7	Apply knowledge of other imaging and therapeutic modalities.
		RTT.7.8	Describe fundamentals of advanced and emerging techniques/procedures.
RTT.8	**Administer substances required for clinical procedures.**	RTT.8.1	Perform venipuncture.
		RTT.8.2	Prepare contrast agents.
		RTT.8.3	Recognize and respond to adverse reactions.
		RTT.8.4	Apply knowledge of the effects of contrast agents.
		RTT.8.5	Administer contrast agents via appropriate route.
		RTT.8.6	Assist with the administration of pharmaceuticals.

Glossary of Terms

Additional precautions: contact, droplet and airborne precautions.

Public Health Agency of Canada, 2016, *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings*. https://www.canada.ca/en/public-health/services/publications/diseases-conditions/routine-practices-precautions-healthcare-associated-infections.html

Advocate: One whose actions ultimately benefit a patient through a combination of promotion and protections of rights and interests.

CAMRT Best Practice Guidelines: Patient Advocacy. https://camrt-bpg.ca/patient-management/patient-family-centered-care/patient-advocacy/

Assistive devices: Those devices that provide physical support to the patient, including, but not limited to: mobility aids (canes, walkers, crutches, prosthetics), mechanical lifts, immobilization devices (splints, slings, collars, restraints), respiratory equipment (oxygen tank).

Collaboration: When two or more members of a healthcare team work together to achieve a common goal. A focus on communication, cooperation and coordination provides a practical means to achieving effective collaboration in the healthcare team.

CAMRT Best Practice Guidelines: Interprofessional Collaboration: https://camrt-bpg.ca/professionalism/collaborative-practice/interprofessional-collaboration/

Cultural safety: The provision of culturally safe care includes (but is not limited to), having knowledge and understanding of power imbalances, institutional discrimination and colonization and the impact on health determinants and the delivery of healthcare. It involves having an understanding of the histories and cultures of the traditional territories in which the MRT practices. It also requires MRT self-reflection and self-awareness and the ability to examine worldviews, held biases/stereotypes, underlying racism and positionality in relation to power dynamics.

National Collaborating Center for Aboriginal Health, *Review of Core Competencies for Public Health: An Aboriginal Public Health Perspective (2015).*

"The goal of cultural safety is for all people to feel respected and safe when they interact with the health care system. Culturally safe health care services are free of racism and discrimination. People are supported to draw strengths from their identity, culture and community."

Northern Health Indigenous Health, https://www.indigenoushealthnh.ca/initiatives/cultural-safety#cultural-safety)

Diversity: Variation among people including, but not limited to, variation based on race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, family status, disability. Canadian Human Rights Commission, 2017.

Your Guide to Understanding the Canadian Human Rights Act.

Entry-to-practice: Initial entry into the profession; the point of certification as an MRT directly following completion of an accredited MRT education program.

Evidence-informed practice: Integrating the best research evidence, clinical expertise and patient values to guide decisions and improve patient outcomes.

Enabling competencies: More detailed components of the key competency. Outlines the relevant knowledge and skills that contribute to the achievement of the key competency.

Informed Consent: See *CAMRT Best Practice Guidelines: Informed Consent*. https://camrt-bpg.ca/patient-management/patient-interactions/informed-consent

Interprofessional: Relating to interactions between two or more members from different professions (e.g., collaborations between MRTs and other healthcare professionals).

Intraprofessional: Relating to interactions between two or more members from the same profession. Ex: MRTs working together to achieve a common goal.

Interventions: Procedures relevant to the performance of diagnostic/therapeutic procedures or those which are integral to patient safety, care and comfort. (e.g., venipuncture, oxygen administration, suction). Patient interventions performed must be within scope of practice and in accordance with provincial regulatory requirements. Further guidance on interventions commonly performed by MRTs can be found in the companion resources associated with the examination blueprint.

Key competencies: The essential knowledge, skills and/or judgement required of a medical radiation technologist at entry-to-practice.

Personal health and wellness: Addresses dimensions of physical, psychological, emotional, intellectual, spiritual and social well-being.

Quality Assurance: Ensures accuracy, consistency, efficiency and safety in the delivery of imaging and therapeutic services. Can include: programmatic organization, qualifications and training of personnel, quality control and preventative maintenance of equipment, policies and procedures, acceptance criteria for image quality, incident monitoring, corrective actions and reporting.
CPQR - *Quality Assurance Guidelines for Canadian Radiation Treatment Programs*.
http://www.cpqr.ca/programs/quality-assurance/
Health Canada – *Diagnostic X-ray Imaging Quality Assurance: An Overview*: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/diagnostic-imaging-quality-assurance-overview.html

Research: Active engagement with evidence through inquiring, appraising, performing, integrating and/or disseminating to change practice and improve outcomes. Research activities may include: journal clubs, article critique, scientific posters, presentations, quality assessment/improvement initiatives, literature reviews, proposals, formulating questions, conducting and analyzing surveys, projects and publication.

Routine practices: "are the infection prevention and control practices for use in the routine care of all patients at all times in all healthcare settings and are determined by the circumstances of the patient, the environment and the task to be performed" (Public Health Agency of Canada, 2016). Routine practices may include: hand hygiene, use of personal protective equipment, aseptic/sterile technique, sharps safety, environment cleaning (ex: linen disposal).
Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings.https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/routine-practices-precautions-healthcare-associated-infections/routine-

practices-precautions-healthcare-associated-infections-2016-FINAL-eng.pdf

Scope of Practice: A scope of practice statement describes the activities in which a practitioner is educated, competent and authorized to perform. For individual practitioners, scope of practice may be influenced by a variety of factors such as experience, continuing education and employment setting.

SAMRT Scope and Standards of Practice, referenced to Saskatchewan Association of Licensed Practical Nurses. (n.d.) Scope of Practice. Regina: http://www.salpn.com/component/content/article/8-salpn/8-scope-of-practice

Social responsibility: Moral obligation to act in the best interests of members of a community.

Stewardship: The responsible planning and management of resources.

Substances: Includes contrast media, specific pharmacological interventions related to clinical procedures and radiopharmaceuticals (NM specific).

Transfer of care: The transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients to another healthcare professional on a temporary or permanent basis. Transfer of care can take place within or between departments.

CAMRT Best Practice Guidelines – Transitions in Care. https://camrt-bpg.ca/professionalism/collaborative-practice/transitions-in-care