CAMRT ACTRM

NUCLEAR MEDICINE

CANADIAN ASSOCIATION OF MEDICAL RADIATION TECHNOLOGISTS

Companion Documents to the 2019 National Competency Profile for Entry-Level Medical Radiation Technologists in Canada

Contents

Purpose of the Companion Documents

The companion documents are a supplemental resource intended to provide additional detail to support the competencies outlined in the *2019 Entry-Level Competency Profile for Medical Radiation Technologists in Canada,* and to provide additional guidance for the curriculum of accredited medical radiation technology (MRT) programs. The companion documents also provide additional guidance to graduates of accredited programs and internationally educated MRTs preparing to write the national certification exam.

Each practice area (magnetic resonance, nuclear medicine, radiological technology and radiation therapy) has a companion document unique to their practice. The companion documents are intended to be responsive to current and evolving practice and may be updated independent of the competency profile.

The companion documents are not intended to be a comprehensive curriculum guide, but rather work to supplement the competency profile by providing additional details to help support curriculum and competency development.

Nuclear Medicine – Companion Resource

1. **Patient Interventions**

This lists the patient interventions referred to in competency:

4.3.4. Provide patient interventions, as appropriate.

Interventions	
1.1	Assist with administration of oxygen.
1.2	Assist with suctioning.
1.3	Administer bedpans and urinals.
1.4	Monitor vital signs.
1.5	Perform CPR.
1.6	Obtain IV access.
1.7	Insert IV line.
1.8	Obtain blood samples.
1.9	Determine blood glucose level.
1.10	Prepare power injector.

2. Imaging Systems

This lists the equipment and quality control procedures referenced in competency:

NM.3. Manage a variety of imaging systems.

Equipment		Quality Control Procedures	
2.1	**Scintillation detectors (well detector & uptake probe)**	2.1.1	Constancy
		2.1.2	Efficiency (sensitivity)
		2.1.3	Energy resolution
		2.1.4	Energy calibration
		2.1.5	Reproducibility (chi square test)
2.2	**Gamma cameras**	2.2.1	Center of rotation
		2.2.2	Energy resolution
		2.2.3	Linearity
		2.2.4	Photopeak determination
		2.2.5	Spatial resolution (planar & SPECT)
		2.2.6	Uniformity (planar & SPECT)
2.3	**Dose calibrators**	2.3.1	Accuracy
		2.3.2	Linearity
		2.3.3	Constancy
		2.3.4	Geometry
2.4	**Survey meters**	2.4.1	Accuracy / calibration
		2.4.2	Battery check
		2.4.3	Constancy
2.5	**PET**	2.5.1	Blank scan
		2.5.2	Coincidence timing
		2.5.3	Detector stability
		2.5.4	Normalization
		2.5.5	Uniformity
		2.5.6	PET/CT offset calibration
		2.5.7	Cross calibration (well counter calibration)

2.6	**Computed tomography (CT)**	2.6.1	CT number accuracy
		2.6.2	CT uniformity
		2.6.3	Daily air calibration
		2.6.4	Environmental/visual inspection
		2.6.5	Image noise
		2.6.6	Image slice thickness
		2.6.7	Linearity of CT numbers
		2.6.8	Safety light / door check
		2.6.9	Spatial resolution
		2.6.10	Tube warm up (including tube current verification)
2.7	**Bone mineral densitometer**	2.7.1	Accuracy
		2.7.2	Precision

3. Common Pathologies, Anomalies & Conditions

This lists the pathologies, anomalies and conditions referred to in competency:

NM.5.2. Apply knowledge of pathophysiology as it relates to clinical procedures.

NM.8.6 Recognize common pathologies, anomalies, and conditions.

Body System		Pathology	
3.1	**Cardiovascular (CV)**	3.1.1	Cardiomyopathy
		3.1.2	Conduction disorders
		3.1.3	Congenital anomalies
		3.1.4	Congestive heart disease
		3.1.5	Infection
		3.1.6	Inflammation
		3.1.7	Shunts
		3.1.8	Valvular disease
		3.1.9	Vascular diseases

3.2	**Gastrointestinal (GI)**	3.2.1	Anemia
		3.2.2	Congenital disease
		3.2.3	Infection
		3.2.4	Inflammation
		3.2.5	Motility disorders
		3.2.6	Neoplasms
		3.2.7	Trauma
		3.2.8	Vascular disease
3.3	**Genitourinary (GU)**	3.3.1	Congenital anomalies
		3.3.2	Cystic disease
		3.3.3	Infection
		3.3.4	Inflammation
		3.3.5	Neoplasms
		3.3.6	Obstructive disorders
		3.3.7	Reflux disorders
		3.3.8	Transplants
		3.3.9	Trauma
		3.3.10	Vascular disease
3.4	**Skeletal (SK)**	3.4.1	Degenerative diseases
		3.4.2	Hematopoietic disorders
		3.4.3	Infection
		3.4.4	Inflammation
		3.4.5	Metabolic disease
		3.4.6	Neoplasms
		3.4.7	Trauma
		3.4.8	Vascular disease
3.5	**Inflammatory process / tumour / lymph (TU)**	3.5.1	Hematopoietic disorders
		3.5.2	Infection
		3.5.3	Inflammation
		3.5.4	Neoplasms
		3.5.5	Trauma
		3.5.6	Vascular disease

3.6	**Central nervous (CN)**	3.6.1	Degenerative diseases
		3.6.2	Infection
		3.6.3	Inflammation
		3.6.4	Neoplasms
		3.6.5	Neurological disorders
		3.6.6	Trauma
		3.6.7	Vascular diseases
3.7	**Endocrine (EN)**	3.7.1	Cystic disease
		3.7.2	Hyperplasia
		3.7.3	Inflammation
		3.7.4	Metabolic disorders
		3.7.5	Neoplasms
3.8	**Respiratory (RE)**	3.8.1	Congenital anomalies
		3.8.2	Hypertension
		3.8.3	Infection
		3.8.4	Inflammation
		3.8.5	Neoplasms
		3.8.6	Obstructive lung disease
		3.8.7	Trauma
		3.8.8	Vascular disease

4. Pharmacologic and Dietary Agents

This lists the classifications of pharmaceuticals referred to in competencies:

NM.5.3. Apply knowledge of the effects of pharmacologic and dietary agents as they relate to clinical procedures.

NM.6.3. Apply knowledge of the effects of pharmaceutical agents

Body System	Pharmacologic Classifications	
4.1 Cardiovascular (CV)	4.1.1	Antiarrhythmics
	4.1.2	Anticoagulants
	4.1.3	Antihypertensives
	4.1.4	Antimuscarinic
	4.1.5	Chemotherapy agents
	4.1.6	Diuretics
	4.1.7	Nitrates
	4.1.8	Xanthines
	4.1.9	Vasodilator
	4.1.10	Diabetic agents
	4.1.11	Dietary fats
	4.1.12	Inotropic agents
4.2 Gastrointestinal (GI)	4.2.1	Antacids
	4.2.2	Laxatives
	4.2.3	Contrast media
	4.2.4	Dietary fats
	4.2.5	H_2 Blockers
	4.2.6	Opioids
	4.2.7	Proton pump inhibitors
	4.2.8	Antihypoglycemic
	4.2.9	Anticholinergic
	4.2.10	Prokinetic agents
	4.2.11	Diabetic agents
	4.2.12	Barbiturates
	4.2.13	Inorganic salts
	4.2.14	Peptide hormones

4.3 Genitourinary (GU)	4.3.1	ACE inhibitors
	4.3.2	Antihypertensives
	4.3.3	Diuretics
	4.3.4	Electrolytes
4.4 Skeletal (SK)	4.4.1	Bisphosphonates
	4.4.2	Chemotherapy agents
	4.4.3	Selective estrogen receptor modulators
	4.4.4	Calcitonin
	4.4.5	Calcium
	4.4.6	Hormone replacement therapy
	4.4.7	Parathyroid hormone
4.5 Inflammatory process / tumour / lymph (TU)	4.5.1	Anesthetic
	4.5.2	Antibiotics
	4.5.3	Chemotherapy agents
	4.5.4	Diabetic agents
	4.5.5	Steroids
	4.5.6	Contrast media
	4.5.7	Glucose
4.6 Central nervous (CN)	4.6.1	Anti-anxiety drugs
	4.6.2	Anticonvulsants
	4.6.3	Carbonic Anhydrase Inhibitors
	4.6.4	Sedatives
	4.6.5	Vasodilators

4.7	**Endocrine (EN)**	4.7.1	Thyroid blocking agents
		4.7.2	Thyroid hormone replacement medications
		4.7.3	Thyroid stimulating agents
		4.7.4	Thyroid suppression medications
		4.7.5	Antiarrhythmic
		4.7.6	Iodinated compounds
		4.7.7	Lithium
4.8	**Respiratory (RE)**	4.8.1	Anticoagulants
		4.8.2	Bronchodilators
		4.8.3	Hormone- based birth control
		4.8.4	Oxygen
		4.8.5	Hormone replacement therapy

5. Clinical Procedures

This lists the clinical procedures referred to in competencies:

NM.5. Apply clinical principles in practice.

NM.7. Perform diagnostic and therapeutic procedures.

General Nuclear Medicine Procedures			
5.1	**Cardiovascular (CV)**	5.1.1	Gated equilibrium SPECT
		5.1.2	Gated equilibrium stress
		5.1.3	Gated equilibrium rest
		5.1.4	Myocardial perfusion gated SPECT (rest and stress)
		5.1.5	Myocardial perfusion non-gated SPECT (rest and stress)
		5.1.6	Myocardial perfusion pharmacological stress SPECT (rest and pharmacological stress)
		5.1.7	ECG Procedure (12-lead)
5.2	**Gastrointestinal (GI)**	5.2.1	Gastric emptying (solid)
		5.2.2	Gastrointestinal bleed
		5.2.3	Hepatobiliary scan
		5.2.4	Hepatobiliary scan with intervention
		5.2.5	Liver spleen scan (colloid)
		5.2.6	Meckel's diverticulum
		5.2.7	RBC liver scan

5.3 Genitourinary (GU)	5.3.1	Effective renal plasma flow
	5.3.2	Glomerular filtration rate (blood GFR)
	5.3.3	Renal cortical scan
	5.3.4	Renal function scan
	5.3.5	Renal scan pharmacological intervention
	5.3.6	Renal transplant
5.4 Skeletal (SK)	5.4.1	Bone marrow imaging
	5.4.2	Bone scan SPECT
	5.4.3	Three phase bone scan
	5.4.4	Whole body bone scan
5.5 Inflammatory process / tumour / lymph (TU)	5.5.1	131-Iodine WB imaging
	5.5.2	Gallium scan
	5.5.3	mIBG imaging
	5.5.4	Somatostatin-receptor imaging
	5.5.5	White blood cell scan
	5.5.6	Sentinel node study
5.6 Central nervous (CN)	5.6.1	Cerebral perfusion study
5.7 Endocrine (EN)	5.7.1	Thyroid scan
	5.7.2	Thyroid uptake
	5.7.3	Parathyroid scan
5.8 Respiratory (RE)	5.8.1	Perfusion lung scan
	5.8.2	Quantitative lung scan
	5.8.3	Ventilation lung scan
PET PROCEDURES		
5.9 PET	5.9.1	Cardiology
	5.9.2	Neurology
	5.9.3	Oncology
RADIATION EMITTING DEVICE PROCEDURES		
5.10 Skeletal	5.10.1	Bone mineral density

5.11 Computed Tomography (CT)	5.11.1	Attenuation correction
	5.11.2	Abdomen enhanced and unenhanced
	5.11.3	Pelvis enhanced and unenhanced
	5.11.4	Chest enhanced and unenhanced
	5.11.5	Extremities
	5.11.6	Head enhanced and unenhanced
	5.11.7	Neck enhanced and unenhanced
	5.11.8	Spine
THERAPEUTIC PROCEDURES		
5.12 Endocrine	5.12.1	Thyroid ablation therapy
	5.12.2	Thyroid therapy for hyperthyroidism
5.13 Tumour	5.13.1	Palliative therapy

National Certification Exam Blueprint

Coming soon.