



# Competency Profile

Entry-to-Practice competencies for the professions of the Alberta College of Medical Diagnostic and Therapeutic Technologists (ACMDTT)

## Magnetic Resonance Technology



Under the *Health Professions Act of Alberta (HPA)*, the ACMDTT is mandated with establishing standards and registering competent and ethical magnetic resonance technologists who can provide high quality medical therapeutic and diagnostic care to the public.

This competency profile lists the competencies required of magnetic resonance technologists at entry-to-practice. Together with the ACMDTT Standards of Practice and Code of Ethics documents it defines the expectations of practitioners on entry to the profession.

The competencies have been validated through broad consultation with the profession in Alberta. They have been cross-referenced with the Canadian Association of Medical Radiation Technologists (CAMRT) national competency profile to ensure that all the national competencies are included. The College has approved the use of the CAMRT Certification Examination as a requirement for entry-to-practice in Alberta.

In areas where the ACMDTT profile goes beyond the requirements of CAMRT, ACMDTT works with the Canadian Medical Association conjoint accreditation process to ensure that all ACMDTT competencies are included in accredited educational programs within the province.

The ACMDTT entry-to-practice competencies were originally developed and approved in 2006. An extensive re-validation process took place in 2010 involving provincial members, national partners, education providers and provincial employers. New profiles were approved on July 9, 2011.

The competency profiles will be reviewed regularly with an aim to reflect current standards for high quality patient services within an evolving work environment.

### **Instructions for educational institutions**

The ACMDTT entry-to-practice competencies identify the minimum learning outcomes required of the magnetic resonance technologists at graduation. The College recognizes that achievement of entry-level proficiency in each competency requires unique cognitive, psychomotor and affective learning. This entry-to-practice competency profile is not considered a curriculum guide. The educational institution should itself determine the level of education and learning activities required to meet the minimum entry-to-practice standard at the expected level of proficiency as set out by the College.

### **Structure**

The entry-to-practice competencies for all professions of the ACMDTT are uniformly structured under the following broad areas of practice:

1. Professional Accountability and Responsibility
2. Workplace Health and Safety
3. Patient Care
4. Operation of Equipment
5. Clinical Procedures
6. Interpretation and Analysis

Within each area, sub-sections have been identified. Although there is significant diversity among the professions, some of the competencies within the sub-sections are common. Other competencies reflect the unique nature and function of the individual professions.

## Definitions

### Competency statement

A competency statement describes a job task in which an entry-level technologist is expected to demonstrate a prescribed level of proficiency.

### Cognitive learning

Learning involving knowledge and thinking skills.

### Psychomotor learning

Learning involving practical skills.

### Affective learning

Learning of attitudes and values that affect cognitive and psychomotor activities.

### Level of proficiency

The degree of mastery that a practitioner demonstrates in a job task. Levels of proficiency range on a continuous scale from learner, to entry-level, to mastery, to expertise, to leadership.

### Entry-level proficiency

The production of results consistent with generally accepted standards in the profession which involves:

- handling routine situations independently within a reasonable time frame
- anticipating likely outcomes and responding appropriately
- recognizing unusual, difficult to resolve and complex situations which are beyond the practitioner's capacity and handling such situations through consultation, supervision, reviewing literature or referral.

## Assumptions

Several assumptions have underscored the development of the entry-to-practice competencies. These are:

1. The minimum requirement for achievement of the stated competencies is that entry-level proficiency is necessary in all competencies except those denoted as "assist". In competencies denoted as "assist", knowledge of the technique is necessary, but not independent performance. Despite this minimum requirement, ACMDTT encourages higher levels of achievement both at entry-to-practice and beyond.
2. A strong foundation of cognitive, psychomotor and affective learning is a pre-requisite for success in achieving the competencies; this learning is initially developed through participation in an ACMDTT-approved educational program.
3. Graduation from an ACMDTT-approved educational program, together with successful completion of the CAMRT certification examination, is indicative of success in achieving the competencies.
4. Learning is expanded through active participation in the provision of high quality medical diagnostic and therapeutic services. This results in levels of proficiency beyond entry-level.

## Resources

Alberta Queen's Printer. (2000). *Health Professions Act: Revised Statutes of Alberta 2000*. Alberta: AQP.

Canadian Association of Medical Radiation Technologists. (2006, 2008) *Competency profiles*. Ottawa: CAMRT.

Canadian Medical Association (2009). *Requirements for Accreditation*. Ottawa: CMA.

## Competency Categories

### 1. Professional Accountability and Responsibility

<b>1.1 Legislation, Standards and Ethics</b>	
1.1a	Follow regulations as set out by the provincial and federal legislation, Standards of Practice and Code of Ethics governing the practice of medical radiation technologists. (see Appendix 1).
1.1b	Recognize the patient's right to accept or refuse medical services.
1.1c	Provide care in a fair and unbiased manner.
1.1d	Comply with employer policies and directives.
1.1e	Maintain complete and secure records.
<b>1.2 Teamwork</b>	
1.2a	Interact effectively as a member of a multidisciplinary health care team.
1.2b	Distinguish between the scopes of practice for health care team members.
1.2c	Demonstrate respect for a diversity of opinions and values.
1.2d	Manage personal workload to contribute to team productivity.
1.2e	Communicate effectively both orally and in writing.
1.2f	Utilize medical terminology in professional communication.
1.2g	Apply basic problem solving and conflict resolution techniques.
1.2h	Provide constructive feedback to colleagues.
1.2i	Respond appropriately to feedback received from others.
<b>1.3 Support to the Profession</b>	
1.3a	Supervise students in the clinical environment.
1.3b	Provide feedback on student performance.
1.3c	Promote the profession to the general public and other health care professionals.
1.3d	Portray a positive and confident demeanour and appearance in all professional activities.
<b>1.4 Professional Competence</b>	
1.4a	Practice within limits of personal knowledge and skills.
1.4b	Self-evaluate and develop clear performance goals to enhance professional effectiveness.
1.4c	Undertake continuing professional development.
1.4d	Participate in quality improvement initiatives.

### 2. Workplace Health and Safety

<b>2.1 Magnet/Magnetic Field Safety</b>	
2.1a	Implement safety practices which adhere to the Health Canada guidelines - Safety Code: 26 (see Appendix 2).
2.1b	Determine if the patient is pregnant and, if so, explain the possible implications of procedures.
2.1c	Perform emergency response in the case of a quench.
2.1d	Use Magnet Emergency Stop (Run Down) button when required.
2.1e	Differentiate between magnetic resonance (MR)-safe and magnetic resonance (MR)-compatible ancillary equipment and take appropriate action to ensure safety.
2.1f	Ensure that all personnel entering the MR environment are aware of the effects on ferrous materials and foreign objects.
2.1g	Ensure proper radiofrequency (RF) coil and equipment cable placement.
2.1h	Identify controlled access area(s) and ensure appropriate warning signage is in place.
2.1i	Identify potential bio-effects of a static magnetic field.
2.1j	Identify potential bio-effects of time-varying magnetic fields.
2.1k	Identify potential bio-effects resulting from radiofrequency exposure.
<b>2.2 Occupational Health and Safety</b>	
2.2a	Apply the standards of the Workplace Hazardous Materials Information System (WHMIS) in the handling, use, storage and disposal of materials (see Appendix 2).

2.2b	Adhere to the workplace standards defined in the Occupational Health and Safety Regulations of the <i>Workers' Compensation Act</i> (see Appendix 2).
2.2c	Apply the standards of Alberta Health and Wellness to prevent contamination of person, equipment and environment (see Appendix 2).
<b>2.3 Emergency/Disaster Plans</b>	
2.3a	Determine the nature and gravity of an emergency situation and take appropriate action.

### 3. Patient Care

<b>3.1 Patient Environment</b>	
3.1a	Administer first aid/basic life support in emergency situations.
3.1b	Perform aseptic or sterile technique as required.
3.1c	Recognize and respond to adverse reactions experienced by patients receiving medications or contrast agents.
3.1d	Administer cardiopulmonary resuscitation (CPR) according to the standard of CPR-Level C as specified by the Heart and Stroke Foundation of Canada.
3.1e	Perform procedures in a manner that maintains the integrity of patient ancillary devices and equipment.
3.1f	Regulate flow rate of portable and wall-mount oxygen supplies.
3.1g	Apply body-fluid precautions to prevent contamination of person(s), equipment and environment.
3.1h	Ensure a safe and comfortable environment for the patient.
3.1i	Transfer patient safely.
3.1j	Perform procedures in a manner that enhances patient comfort.
<b>3.2 Patient Assessment and Intervention</b>	
3.2a	Verify patient's identity.
3.2b	Assess patient's level of understanding of the procedure and adapt communication, assessment and screening accordingly.
3.2c	Adapt procedure according to patient's mobility and stability.
3.2d	Screen patient for the procedure.
3.2e	Assess patient for contraindications to the procedure.
3.2f	Ensure the removal of contraindicated materials from all persons entering the MR area.
3.2g	Verify patient's consent for procedure.
3.2h	Assess implications for scanning of common implants and take appropriate action.
3.2i	Recognize and respond to changes in patient's physical condition, behaviours and level of consciousness.
3.2j	Recognize and respond to changes in patient's vital signs.
3.2k	Perform procedures in a manner that maintains patient's dignity.
3.2l	Perform venipuncture. <i>* The ACMDTT acknowledges that the practice of venipuncture in a clinical setting will be limited for the entry-to-practice Magnetic Resonance Technologist; therefore, for the purpose of achieving competence at the program level simulation of venipuncture is acceptable.</i>
3.2m	Administer contrast agents as required for imaging purposes.
3.2n	Administer medications as required for imaging purposes.
<b>3.3 Communication and Education</b>	
3.3a	Identify self and explain professional role.
3.3b	Facilitate patient's understanding by encouraging and responding to questions and concerns.
3.3c	Respond to patient's family/representative within the parameters of patient confidentiality.
3.3d	Refer patient concerns to other health care providers as appropriate.
3.3e	Explain possible RF exposure implications for patient.
<b>3.4 Recording and Documentation</b>	
3.4a	Maintain comprehensive records.
3.4b	Utilize information and archival systems.
3.4c	Maintain confidentiality of records with appropriate access.

## 4. Operation of Equipment

<b>4.1 Fundamental Equipment Procedures</b>	
4.1a	Operate only licensed equipment while performing procedures.
4.1b	Operate equipment in accordance with manufacturers' specifications.
4.1c	Ensure operational readiness of equipment for specified procedure/study.
4.1d	Ensure regular maintenance and cleanliness of equipment.
4.1e	Operate computer workstations.
<b>4.2 Equipment Quality Control (QC)</b>	
4.2a	Ensure mechanical functionality of equipment.
4.2b	Perform regular QC as required by the manufacturer.
4.2c	Document QC procedures/errors.
4.2d	Perform basic troubleshooting; correct or report as appropriate.
4.2e	Evaluate equipment QC and take corrective action as required.

## 5. Clinical Procedures

<b>5.1 Fundamental Clinical Procedures</b>	
5.1a	Verify procedure ordered.
5.1b	Ensure procedure requisition contains required information; address inconsistencies.
5.1c	Determine appropriate imaging planes and scan sequences for the patient, in consultation with radiologist.
5.1d	Prepare the physical area for the patient.
5.1e	Position the patient.
5.1f	Utilize immobilization devices.
5.1g	Utilize positioning aids.
5.1h	Instruct patient on use of communication equipment and anti-claustrophobia strategies.
5.1j	Organize scan sequences in an efficient manner.
5.1l	Actively monitor patient during procedure and take appropriate action.
5.1m	Optimize, capture and store electronic images.
5.1n	Assess images and data set for acceptability and completeness.
5.1o	Submit images for review.
<b>5.2 Operate MR System</b>	
5.2a	Utilize knowledge of internal anatomy to initially locate region of interest.
5.2b	Apply the coil which is compatible with the requested procedures and patient characteristics.
5.2c	Select appropriate phase and frequency encoding directions for the region of interest, the imaging plane and the anatomy to be visualized.
5.2d	Utilize appropriate shimming parameters.
5.2e	Utilize and adjust motion reduction parameters and equipment as necessary.
5.2f	Select parameters to achieve desired contrast.
5.2g	Program protocol sequences.
5.2h	Evaluate image parameters to be used for scanning acquisitions.
5.2i	Obtain images of the central nervous system.
5.2j	Obtain images of the head and neck.
5.2k	Obtain images of the musculoskeletal system.
5.2l	Obtain images of the cardiovascular system.
5.2m	Obtain images of the thorax.
5.2n	Obtain images of the abdomen.
5.2o	Obtain images of the bony pelvis.
5.2p	Obtain images of the female pelvis.
5.2q	Obtain images of the male pelvis.
5.2r	Perform diffusion studies.
5.2s	Manipulate cine acquisitions.

5.2t	Manipulate dynamic contrast enhanced image sets.
5.2u	Adjust scan parameters for intrinsic field inhomogeneities.
5.2v	Adjust scan parameters for extrinsic field inhomogeneities.
5.2w	Identify image artefacts caused by processing; modify processing conditions to correct.
5.2x	Perform multi-planar reconstructions.
5.2y	Perform maximum intensity projection data manipulations.

### **5.3 Specialized Imaging Procedures**

5.3a	Assist with procedural requirements for cardiac imaging.
5.3b	Assist with MR spectroscopy.
5.3c	Assist with perfusion studies.

### **5.4 Adapt Clinical Functions**

5.4a	Adapt scanning procedures according to patient condition and presentation.
5.4b	Adapt standard treatment protocols for pediatric patients.
5.4c	Evaluate images and identify the need for additional scans.

## **6. Interpretation and Analysis**

### **6.1 Analysis and Enhancement of Practice**

6.1a	Utilize problem-solving strategies.
6.1b	Generate and evaluate effectiveness of alternate approaches to practice.
6.1c	Critically evaluate performance to ensure best practice.
6.1d	Manage professional and personal roles to minimize risk.
6.1e	Manage resources effectively.
6.1f	Assist in research-based initiatives.
6.1g	Maintain awareness of changes within the Canadian healthcare environment as they affect the practice of magnetic resonance technology.

## Appendix 1

### Provincial/Federal Legislation

1. *Health Professions Act* (2000) **AB**  
Information available through:
  - Alberta Queen's Printer (website)
  - Alberta Government: Health and Wellness (website)
2. *Health Information Act* (2000) **AB**  
Information available through:
  - Alberta Queen's Printer (website)
  - Office of the Information and Privacy Commissioner of Alberta
3. *Protection for Persons in Care Act* (2009) **AB**  
Information available through:
  - Alberta Queen's Printer (website)
  - Alberta Government: Seniors and Community Services (website)

### Standards

1. ACMDTT Standards of Practice  
Information available through:
  - ACMDTT (website)
2. ACMDTT Code of Ethics  
Information available through:
  - ACMDTT (website)

## Appendix 2

### Workplace Health and Safety

1. *Occupational Health and Safety Act* (2000) **AB**  
Information available through:
  - Alberta Queen's Printer (website)
  - Human Resources and Skills Development of Canada (website)

#### Key search items:

*Back care & lifting*

*Ergonomics*

*Storage & handling*

*Use of tools, appliances, etc.*

*Serious injuries & accidents.*

*Biological hazards*

*Chemical hazards*

*Fire/explosion hazards*

*Physical hazards*

*Personal protective equipment*

2. Alberta Infection Prevention and Control Strategy (2008)  
Information available through:
  - Alberta Health website



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