



Ordre des technologues
en **imagerie médicale**,
en **radio-oncologie** et en
électrophysiologie médicale
du Québec



ENTRY-LEVEL PROFILE



Medical imaging
TECHNOLOGIST
— Radiodiagnosis

**Ordre des technologues en imagerie médicale,
en radio-oncologie et en électrophysiologie médicale du Québec
(OTIMROEPMQ)**

6455 Jean-Talon Street East | Suite 401
Saint-Léonard, QC H1S 3E8
Telephone: 514-351-0052 | 1-800-361-8759 | Fax: 514-355-2396

Note:

- To interpret this profile correctly, read the document in its entirety and refer to the Code of ethics and the general and specific standards of practice

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INTRODUCTION

The entry profile to the profession demonstrates the competencies that a medical imaging technologist in the radiodiagnostic field should possess upon entering the profession. It is aimed towards candidates presenting for the admission examination as well as to members of the admission committee of the Ordre des technologues en imagerie médicale, en radio-oncologie et en électrophysiologie médicale du Québec (OTIMROEPMQ).

The entry-level profile is a reference tool to partly serve as orientation for future technologists in their preparatory journey in obtaining their permit to exercise and partly serves to guide the drafting of the scenarios used during the admission examination. It is important to note that these scenarios are representative of the reality of the work environment and aim to evaluate the level of competency attained by the candidates as well as the evaluation of the integration of the theoretical knowledge in practice.

Also, the targeted competencies of the entry-level profile to the profession meet the prescribed current training requirements of the ministry.

According to the ministère de l'Enseignement supérieur (MES),

The goal of the Diagnostic Imaging program is to form diagnostic imaging technologists.

Diagnostic imaging technologists are health sector professionals who are employed by public or private health institutions. They work in dedicated medical imaging departments and services, and also in a variety of other environments, including at patients' bedsides and in operating rooms. Their role is to produce the best possible images, based on a medical prescription, using ionizing radiation and other energy forms, and to gather data that radiologists and other medical specialists can use to make a diagnosis or produce a treatment plan. Diagnostic imaging technologists play a role in and contribute to the delivery of services to patients.

Diagnostic imaging technologists can work in different areas of the medical imaging field, for adult or pediatric patients:

- General radiography
- Bone densitometry
- Mammography
- Fluoroscopy
- Angiography
- Computed tomography
- Magnetic resonance

Diagnostic imaging technologists may be asked to conduct a variety of examinations on a broad range of patients of all ages with all types of physical and psychological conditions, in every field of diagnostic radiology. They may also participate in other types of examinations through procedures performed during medical interventions.

Diagnostic imaging technologists use specialized equipment and appropriate substances to produce, process, transmit and archive medical imaging data, with due regard for the patient's particular needs and the safety conditions specific to each context. They may also be asked to train new technologists in their field of expertise, and to perform or assist with research in the field of diagnostic radiology.

To practice their profession, diagnostic imaging technologists must be members of the Ordre des technologues en imagerie médicale, en radio-oncologie et en électrophysiologie médicale du Québec (OTIMROEPMQ).

The professional practice of diagnostic imaging technologists is governed by a regulatory framework, including the Act respecting medical imaging technologists, radiation oncology technologists and medical electrophysiology technologists, and professional code of ethics. (Gouvernement du Québec, 2020, p.13).

This document has been updated to reflect the current Canadian Association of Medical Radiation Technologists (CAMRT) Competency Profile and the 2012-2018 MES Occupational Analysis. It also takes into account Quebec's Medical Imaging, Radiation Oncology and Medical Electrophysiology Technologists Act, applicable regulations and standards of practice as well as OTIMROEPMQ's competency framework.

The Order's competency framework is based on the definition of a professional competence of the Office Québécois de la langue française (OQLF), which describes competence as a combination of knowledge, know-how and professional demeanor in the context of a concrete work situation (OQLF, 2013). It involves the integration of knowledge, skills, attitudes and judgment into real clinical situations that require technologists to solve problems, communicate and think critically to meet patient needs (OTIMROEPMQ, 2018-2019).

The first part of the document is dedicated to the professional profile describing the specific skills a technologist must possess. The detailed competencies are then grouped by theme. Please note that emphasis is placed on the critical thinking and technical gestures that a medical imaging technologist entering the profession must develop to work in partnership with the patient and other professionals in the multidisciplinary team. The proficiency level was based on the revised Bloom taxonomy (see Appendix 6).

Finally, at the end of this document, you will find six appendices (main examinations; equipment; pathologies; abbreviations, terms to be used; pharmaceuticals, some definitions, and the Bloom taxonomy) as well as a bibliography listing the references governing the profession.

PROFESSIONAL ATTITUDE

This section is intended to identify specific attitudes that a technologist must have upon entering the profession. It is intrinsic to the routine practice of medical imaging technologist and applies to all sections of this document.

AUTONOMY

- Show initiative
(acknowledge and be mindful of tasks to be done,...)
- Take decisions to be efficient in all situations
(medical emergencies, failed equipment,...)
- Recognize one's limits and be able to seek help from the appropriate resources in order to allow proper management any given situation
- Demonstrate good judgment
- Be organized, responsible and methodical

ADAPTATION AND MULTIDISCIPLINARY INTEGRATION

- Establish a relationship of trust with various staff
(co-workers, radiologists, nutritionists, nurses,...)
- To integrate within the work team
(adapt to the way co-workers and supervisors proceed,...)
- Establish a relationship of respect with peers and the multidisciplinary team
- Adapt to changes
(team, technological advances, specialties,...)
- Manage stress

VERBAL AND NON-VERBAL COMMUNICATION

- Have the ability to communicate clearly, precisely and adapted to the clientele
- Develop trust
(with the patient, team,...)
- Is empathetic, patient, respectful and available
- Have good listening skills and demonstrate openness towards others
(with patients, co-workers,...)
- Control one's emotions while performing daily tasks
- Use verbal and non-verbal communication that is compatible with the professional ethics
- Express oneself in a constructive manner

COMMITMENT TO THE PROFESSION

- Be interested and motivated
(conferences, current events,...)
- Demonstrate intellectual and scientific curiosity and in one's area of expertise
(commitment, critical thinking regarding one's work,...)
- Maintain one's knowledge up-to-date
- Show attention to detail, is meticulous
- Be rigorous

RULES, ETHICS AND CODE OF ETHICS

- Show ethical behaviour
(with the patient, peers, supervisors,...)
- Comply with the various laws, regulations, rules and standards
- Respect confidentiality, be discrete
- Be vigilant
- Adopt safe work methods with patient, co-workers and one-self

COMPETENCY STATEMENTS

A - PROFESSIONAL PRACTICE

N.B. The competency “Professional Practice” is intrinsic to the routine practice of medical imaging technologists and applies to all sections in this document.

A-1: DEMONSTRATE CRITICAL THINKING

- 1.1 Consider the patient's condition and the availability of resources to establish case priority**
(review the work schedule, communicate with other health professionals responsible for the patient, ensure the material is available,...)
- 1.2 Consider all the elements that could influence the delivery of an exam and intervention**
(general anatomy, topography, physiology, pathology, prescription, previous exams, contraindications, equipment, interdisciplinary professionals involved,...)
- 1.3 Adapt procedures based on elements influencing the examination and intervention**
(prescription, patient's condition, images and reports from previous exams and related disciplines, faulty equipment,...)
- 1.4 Optimize outcomes based on the work context, while respecting established protocols to ensure optimal quality of the services provided to patients**
(exams, treatments, procedures...)
- 1.5 Determine the purpose of the procedure**
(images, patients, health professional, examination context, images obtained,...)
- 1.6 Apply problem-solving strategies**
- 1.7 Apply stress management techniques**
- 1.8 Apply conflict resolution techniques**

A-2: DEMONSTRATE PROFESSIONAL BEHAVIOUR

- 2.1 Practice in accordance with legislation, rules and current standards of practice**
(discretion, confidentiality, professional attitude, personal appearance that inspires respect and trust,...)
- 2.2 Act only according to an individual or collective prescription signed by a professional entitled to do so by the law**
- 2.3 Demonstrate an attitude that is compliant with the standards of professional conduct**
(avoid private conversations, avoid giving impressions or making comments and remarks, preserve the patient's dignity,...)
- 2.4 Show respect and sensitivity in both patient and professional interactions**
(stress management, conflict resolution, adapting to change in the work environment,...)
- 2.5 Prepare the required locations, equipment, material and accessories before taking the patient into the room**
- 2.6 Apply an optimal work method based on the context**
(patient's condition, material availability, maximize efficiency,...)
- 2.7 Contribute to personal professional development**
- 2.8 Develop a scientific mind**
(problem-solving, nomenclature, terminology, curiosity, critical thinking,...)
- 2.9 Participate in human and material resource management to ensure one's smooth operation of the workstation.**
- 2.10 Collaborate with other professionals by establishing good communication, by exchanging relevant information and by performing tasks in the patient's interest**
- 2.11 Provide the health professionals involved with relevant information that could be helpful in performing and interpreting the examination or procedure**
- 2.12 Help update technical procedures**
- 2.13 Participate in the elaboration of new examination techniques**
- 2.14 Apply one's electronic signature to endorse written information and comments included in the patient's file and electronic requisition**

A-3: CONTRIBUTE TO TRAINING AND PRACTICAL INSTRUCTION

- 3.1 Explain the general operation of the department**
- 3.2 Explain the examination and treatment procedures**
- 3.3 Explain the operation of the devices and equipment**
- 3.4 Participate in theoretical and practical teaching**
- 3.5 Take part in evaluation process of the trainees**

B - RESPECT HEALTH AND SAFETY PRINCIPLES

N.B. Respect health and safety principles applies to each of the points described in this document.

B-1: MANAGE EQUIPMENT AND SITE RISKS

- 1.1** Apply occupational health and safety standards and quality assurance program (WHMIS, PDSP, OHS, GHS, PQDCS,...)
- 1.2** Apply the establishment's plan for emergency measures (emergency codes, disasters,...)
- 1.3** Check cart and emergency equipment (expiry date, product integrity, location,...)
- 1.4** Handle biomedical, chemical, pharmaceutical waste according to established standards
- 1.5** Report issues related to equipment and material (see Annex 2)
- 1.6** Maintain a clean and safe work environment
- 1.7** Check safety devices (door lock, emergency buttons,...)
- 1.8** Ensure proper storage of equipment and material (protective apron, immobilization equipment,...)
- 1.9** Record any event related to an incident or accident (file, records, AH-223 form,...)

B-2: MANAGE RISKS ASSOCIATED WITH THE PATIENT

- 2.1 Apply sterile work methods**
- 2.2 Provide clinical care in relation to the examination and the procedure**
- 2.3 Apply strategies allowing to respond to emergency situations**
(patient vital signs, CPR, agitated patient, emergency measures, QUENCH,...)
- 2.4 Monitor the parameters for ancillary devices**
(sphygmomanometer, oxygen, automatic injector, perfusion pump saturometer,...)
- 2.5 Apply immobilization techniques adapted to the patient's age and condition**
- 2.6 Use safe movement and transfer techniques appropriate to the patient's condition**
(PDSP, movement in case of fracture,...)
- 2.7 Handle accessories in a safe manner for the patient**
(drip, oxygen, probes,...)
- 2.8 Ensure patient comfort and safety**
(immobilization, blanket, pillow, neck collar,...)
- 2.9 Maintain visual and auditory contact with the patient at all times**
(avoid injuries, ensure radiation protection, ensure clinical monitoring...)
- 2.10 Follow preventive procedures for immune-suppressed patients**
- 2.11 Apply established measures to prevent from risks that may harm the patient**
(human error, mechanical malfunction, technological failure, contingency plan,...)
- 2.12 Record data in patient file**
(technical factors, pregnancy, patient condition, contrast media, allergy, incident, accident, AH-223 form,...)

B-3: APPLY THE PRINCIPLES OF ERGONOMICS

- 3.1 Adopt proper ergonomic work postures**
- 3.2 Use ergonomic transfer techniques.**
- 3.3 Maintain a safe and ergonomic work area**

B-4: CONTROL INFECTIONS

- 4.1 Safely handle pointed or sharp objects, contaminated material and biomedical waste**
- 4.2 Dispose of pointed or sharp objects, contaminated material and biomedical waste appropriately**
- 4.3 Prevent the transmission of infections at all times by applying basic infection control methods according to the established procedures**
(changing bedding, washing hands, wearing gloves and a mask,...)
- 4.4 Prevent the transmission of infections by applying additional precautions according to the established procedures**
(personal protection clothing, N95 mask,...)
- 4.5 Apply infection control techniques to prevent the transmission of micro-organisms for equipment and examination rooms**
- 4.6 Prioritize actions based on infection prevention**

C - PERFORM QUALITY CONTROL

N.B. Quality assessment applies to each modality described in sections G, H and I of the current document.

C-1: ASSESS EQUIPMENT PERFORMANCE

- 1.1 Apply personal knowledge to operate equipment properly**
- 1.2 Apply quality control measures according to manufacturer's schedules**
(manufacturer's standard, safety code 35, internal procedures,...)
- 1.3 Communicate quality control test results and issues clearly and accurately**
- 1.4 Record data and test results**
- 1.5 Take the necessary measures to make corrections when a test irregularity is encountered**
(stop the procedure, advise the coordinator, adapt the parameters,...)
- 1.6 Help create and update technical files, quality control protocols and maintenance procedures**
(detectors, monitors, work stations,...)
- 1.7 Perform a daily check of each equipment**
(visual, auditory inspection,...)

C-2: ASSESS IMAGE QUALITY

- 2.1 Validate information in the RIS and PACS systems**
(patient identification, markers, treatment algorithm,...)
- 2.2 Consider all parameters that influence the quality of the image**
(artefacts, retakes, signal-to-noise ratio,...)
- 2.3 Analyze rejects and repeats to improve the process**
- 2.4 Process the images**

D – PATIENT MANAGEMENT

N.B. Patient management applies to each modality described in sections G, H and I of this document.

D-1: GREET PATIENT IN A PROFESSIONAL MANNER

- 1.1 **Verify the patient's identity using at least two indicators**
- 1.2 **Introduce oneself to the patient and clearly identify one's profession**
- 1.3 **Establish the patient's spoken language and use proper terminology; if needed, request the presence of an interpreter**
- 1.4 **Evaluate the patient's cognitive, physical and mental condition**
- 1.5 **Validate patient preparation**
- 1.6 **Establish a trust relationship**
(visual contact, active listening, empathy,...)
- 1.7 **Respect the patient's privacy**
(close the door to the examination room, validate the questionnaire in a private place, cover the patient,...)
- 1.8 **Verify with the patient the accuracy of the written information on the requisition for the upcoming examination or intervention**
- 1.9 **Act in accordance with the code of ethics to avoid any behaviour leading to interpretation and implicating acts of intimacy**
(sexual, psychological,...)
- 1.10 **Act according to the patient's cognitive, psychological, and physical condition throughout all aspects of the patient's care**

D-2: ANALYZE THE PATIENT'S REQUISITION AND CHART

- 2.1 Verify the conformity of the requisition**
(signature, relevance of the requested examination, contraindications any missing data, patient's name, date,...)
- 2.2 Analyze the information on the requisition pertaining to the performance of the examination or intervention**
(clinical information, examination requested,...)
- 2.3 Consult the medical file regarding the examination and intervention requested**
(blood work report,...)
- 2.4 Verify the patient's radiological chart**
(previous examinations, contraindications,...)
- 2.5 Demonstrate an understanding of reports and previous images from related disciplines**
- 2.6 Correct any mistakes present in the patient's chart**
- 2.7 Ensure confidentiality when collecting pertinent information to the examination and intervention**
(medical history questionnaire, contraindication questionnaire and radiological and medical chart, preparation,...)

D-3: EXPLAIN THE EXAMINATION TO THE PATIENT AND/OR COMPANION

- 3.1 Give clear explanations of the examination or intervention adapted to the to the patients needs for information**
- 3.2 Explain the goal of administering any drugs and/or contrast material, as well as any possible side effects**
- 3.3 Validate the contraindications to any aspect of the examination and intervention (medical history questionnaire,...)**
- 3.4 Describe the sequence of events for the examination and intervention**
- 3.5 Provide instructions to ensure the examination and intervention are properly carried out**
- 3.6 Reassure the patient with regard to the role, proximity and movements of the equipment**
- 3.7 Provide instructions for radiation protection**
- 3.8 Answer the patient's questions**
- 3.9 Validate the patient's understanding**
- 3.10 Communicate to the patient relative information regarding the follow-up of their file**
- 3.11 Have the patient remove any objects or clothing that could interfere with the quality of the examination or intervention**
- 3.12 Ensure the patient consent to the delivery of the examination or intervention**

D-4: MANAGE PRIORITIES

- 4.1 Establish and update the order of priorities in the examination room**
- 4.2 Verify patient's availability and preparation**
- 4.3 Advise associated services to prepare patients and synchronize procedures**
- 4.4 Reorganize the work schedule around emergencies (intensive care patients, emergency, ...)**
- 4.5 Coordinate patient transportation**

D-5: ENSURE THE PATIENT'S FOLLOW-UP

- 5.1 Coordinate the patient's various examinations**
(confirm with patient's next appointment in the department, doctors, other professionals,...)
- 5.2 Document observations and relevant information in the chart**
- 5.3 Communicate relevant information to other professionals involved**
- 5.4 Give to the patient the appropriate instructions or recommendations to follow after examination and intervention**
- 5.5 Provide the patient information regarding available resources.**(explanatory sheets, CLSC, specialists,...)

E - MANAGE DATA AND IMAGE RECORDING

N.B. The management of systems for recording data and images applies to each of the points described in sections G, H and I of this document.

E-1: USE ARCHIVING SYSTEMS

- 1.1 Record information in patient's medical chart and radiology file**
(RIS, PACS,...)
- 1.2 Use the modalities of the system to identify performed examinations and related images**
(PACS worklist,...)
- 1.3 Add one's electronic signature to endorse the written information and comments in a patient's chart or electronic request**
- 1.4 Apply established procedures in case of patient identification error related to the patient or electronic images**
- 1.5 Proceed to the archiving and retrieving of images and data related to the examination**
- 1.6 Verify the transfer of images to the archiving system**

F - MANAGE CONTRAST MEDIA AND MEDICATION

N.B: Manage contrast media and medication applies to each of the points described in sections G, H, I of the current document.

F-1: ADMINISTER CONTRAST MEDIA SUBSTANCES AND MEDICATION

- 1.1 Verify the integrity of the material used for injections and identify any irregularity that could compromise the quality of the act**
(beyond use date, BUD, expiry date, intact wrapping,...)
- 1.2 Select the specific material intended for the various procedures**
(puncture, perfusion, injection, ...)
- 1.3 Fill out the patient's medical history questionnaire**
- 1.4 Consider pharmacological characteristics of the administered drugs and their interaction**
- 1.5 Administer contrast media and drugs according to established procedures**
(dosage, dilution,...)
- 1.6 Intervene in cases involving reactions to contrast media and drugs**
(extravasation, allergies,...)
- 1.7 Perform intravenous catheter installation and removal**

G - PARTICIPATE IN INTERVENTIONAL PROCEDURES

N.B. Participate in interventional procedures applies to each of the sections described in sections H and I of this document.

G-1: PARTICIPATE IN PROCEDURES

- 1.1 Prepare the equipment and material**
(clamps, catheters, guides, sterile tray, verify expiry dates, laboratory analysis, pot, sample slab,...)
- 1.2 Provide the patient with the necessary care throughout the procedure**
(dressings, securing the catheter, compression, vital signs,...)
- 1.3 Apply asepsis principles and sterile material handling techniques**
(sterile drapes setup, working surface,...)
- 1.4 Assist medical specialist**
- 1.5 Use an ultrasound probe for scout and localization**
- 1.6 Consider the effects and risks associated with ultrasound**

H - PERFORM X-RAY EXAMINATIONS

N.B. For this modality, the work process described in sections A, B, C, D, E, F and G of the current document apply.

H-1: ENSURE RADIATION PROTECTION

- 1.1 Apply techniques and work methods that reduce radiation dose while maintaining the quality of the examination and intervention (ALARA)**
(patient preparation, technical parameters, exposure indicator, patient of reproductive age, protective apron,...)
- 1.2 Perform positioning using appropriate means to maximize the protection of sensitive organs**
(Dose modulation software for radiosensitive organs, Bismuth,...)
- 1.3 Apply immobilization techniques based on patient's age and condition**
- 1.4 Apply one's knowledge of the effects and risks associated with ionizing radiation**
- 1.5 Apply the necessary radiation protection measures for the safety of the environment, the general public and health professionals**
- 1.6 Follow instructions from Health Canada's National Dosimetry Services regarding the rules of use and precautions to be taken with dosimeters**
(optically stimulated luminescence (LSO), dosimeter,...)
- 1.7 Check the radiation dose**
(absorbed dose, effective dose, dose area product, mA modulation, noise index,...)
- 1.8 Identify the role of various radiation protection authorities**
(ICRP, RPB,...)

H-2: PERFORM RADIOGRAPHIC AND RADIOSCOPIC EXAMINATIONS

(EXAMINATION ROOM, INTERVENTIONAL ROOM, MOBILE EQUIPMENT)

- 2.1 Determine the technical parameters needed to produce a diagnostic image**
(kV, mAs, automatic exposure meter, SID, focal spot, anti-scatter grid,...)
- 2.2 Use the material to optimize image quality and radiation protection**
(receptor, anti-scatter grid, means of immobilization, compensatory filter, protective apron,...)
- 2.3 Position the patient according to the projections to be performed**
(see Appendix 1)
- 2.4 Use the fundamental laws of imaging to produce optimal images**
(optical laws, image sharpness,...)
- 2.5 Use the proper image acquisition and processing method**
- 2.6 Center the radiation beam on the anatomy and receptor to achieve maximum image accuracy**
- 2.7 Apply optimal collimation to meet radiation protection and image quality principles**
- 2.8 Use anatomical markers**
(lead letters, digital letters, position markers, time markers,...)
- 2.9 Analyze the radiological images**
- 2.10 Assess the value of the exposure indicator**
(EI, EXI, S, IgM,...)
- 2.11 Adjust technical parameters as required to meet radiation protection and image quality principles**
- 2.12 Obtain additional images as needed**
- 2.13 Record technical specifications in the radiological record**
(DFR, patient's position, stretcher, patient's condition, radioscopy time,...)

H-3: PERFORM BONE DENSITY EXAMINATIONS

- 3.1 Analyze previous XRay images of the targeted anatomical areas**
- 3.2 Determine according to the established procedure**
- 3.3 Position the patient and the area of interest to allow measurements**
- 3.4 Ensure consistency in realizing the examinations**
- 3.5 Center the area of interest using the landmarking light beam**
- 3.6 Select the scanning method and the acquisition parameters according to the established procedure**
(patient's condition,...)
- 3.7 Assess the image quality and analyze the data collected before the patient leaves**
(anatomy, physiology, patient's position, pathology,...)
- 3.8 Perform additional measurements, if necessary**
(distal third of forearm, forearm, whole body,...)
- 3.9 Record data in patient record**
(keep a record of the procedures for conducting subsequent reviews,...)

H-4: PERFORM COMPUTED TOMOGRAPHY (CT) EXAMINATIONS

- 4.1 Select the program based on the requested examination**
- 4.2 Enter into the computer the information needed to perform the examination**
(data related to the patient, patient orientation, name of the radiologist,...)
- 4.3 Perform centering and acquire the localization image specific to the region to be examined**
- 4.4 Accurately select the slice lines and parameters based on the exam to be performed and according to the established protocol**
- 4.5 Demonstrate structures of interest as per established protocol for each examination**
- 4.6 Process images ensuring the quality of all slices of the regions of interest and the different windows required for image interpretation**
(bone windows, parenchymal windows, soft tissue windows,...)
- 4.7 Apply image processing and reconstruction methods**
(MPR, MIP, MinIP, VRT, 3D, virtual colonoscopy,...)
- 4.8 Manipulate the digital images to enhance or maintain examination quality**

H-5: PERFORM MAMMOGRAPHY EXAMINATIONS

- 5.1 Position the patient or anatomical part (CC, MLO)**
- 5.2 Modify the technical parameters according to the patient (breast implants,...)**
- 5.3 Assess the quality of the images produced (artifacts, antiperspirants, folds, positioning,...)**
- 5.4 Assess the exposure indicator value and adjust the technical parameters as needed**

I – PERFORM MRI EXAMINATIONS

N.B. For this modality, the working process described in sections A, B, C, D, E, F and G of the current document applies.

I-1: ENSURE PROTECTION DURING AN MRI

- 1.1 **Apply MRI safety standards** (hearing protection, safety zones, limb crossing, skin/cable contact and skin/gantry contact,...)
- 1.2 **Ensure controlled access to the magnet/examination room to ensure the safety of patients, visitors and staff members**
(patients, companions, doctors, radiologists, nurses, respiratory therapists, anesthetists, maintenance staff...)
- 1.3 **Ensure that no loose ferromagnetic objects are introduced into the magnet/scan room**
- 1.4 **Consider the effects and risks associated with the electromagnetic field**
(SAT/SAR, pregnancy,...)
- 1.5 **Apply the MRI protection measures required to ensure the safety of the environment, the general public and health professionals**
- 1.6 **Review with the patient the pre-exam questionnaire to validate the risk factors and any contraindications to the examination**

I-2: PERFORM MRI EXAMINATIONS

- 2.1 **Advise the specialist of the presence of risk material in the patient**
- 2.2 **Select the protocol at the console, appropriate coil for the exam and use according to manufacturer's standards** (Surface Coil, Volume Coil, Intra Cavity Coil, Flex, Torso-body...)
- 2.3 **Position the patient and center the light according to the region of interest**
(comfort, isocenter structures,...)
- 2.4 **Use means of immobilization**
(movement, comfort,...)
- 2.5 **Select the slice lines according to the protocol** (FOV, slice block, phase encoding, frequency,...)
- 2.6 **Proceed to the acquisition of images**
(T1, T2, DP, IR (FLAIR, STIR), Fat Sat, GRE, SE, TSE, diffusion, TR, TE, NEX, fragmentation, BLADE / Propeller / radial sampling, single shot / HASTE,...)
- 2.7 **Assess image sequences quality**
(contrast, resolution, noise, motion, artifacts, anatomical coverage required, apparent diffusion coefficient (ADC),...)
- 2.8 **Reconstruct the images according to the established protocol**
(2D, 3D)

APPENDIX 1: LIST OF MAIN EXAMINATIONS

RADIOGRAPHIC AND RADIOSCOPIC EXAMINATIONS

Anatomical parts

Upper extremities	Fingers
	Hand
	Wrist, scaphoid
	Forearm
	Elbow
	Humerus
	Shoulder
	Scapula
	Clavicle
	Acromioclavicular joints
	Sternoclavicular joint
Lower extremities	Toes
	Foot, calcaneus
	Ankle
	Leg
	Knee, patella
	Femur
	Hip
	Pelvis

RADIOGRAPHIC AND FLUOROSCOPIC EXAMINATIONS

Anatomical parts

Spine	Rib cage
	Sternum
	Cervical spine
	Thoracic spine
	Lumbar, lumbosacral spine
	Sacrum
	Coccyx
	Sacroiliac joints
Head	Skull
	Facial bones, nasal bone
	Orbits
	Mandible
Digestive system	Abdomen
	Esophagus
	Stomach
	Small intestine
	Colon (large intestine)
Respiratory system	Soft tissues of the neck
	Lungs
Neurological system	Spinal cord
Urinary system	Kidneys
	Ureters
	Bladder
	Urethra
Genital and reprod. system	Uterus
	Breasts
Cardiovascular system	Heart and blood system (arteries, veins, capillaries)

BONE DENSITOMETRY EXAMINATIONS

Anatomical parts

	Lumbar spine
	Hip, proximal femur
	Whole body
	Forearm
	distal third of forearm

CT EXAMINATIONS

Anatomical parts

	Head C+ and C-
	Neck C+ and C-
	Chest C+ and C-
	Vertebral Spine C+ and C-
	Abdomen and pelvis C+ and C-
	Extremities (feet, knees, wrists, elbows, shoulders.)

MRI EXAMINATIONS

Anatomical parts

	Head C-and C+
	Vertebral spine C-and C+
	Abdomen C-and C+
	Pelvis C-and C+
	osteo articular (knees, wrists, shoulders...)

APPENDIX 2: EQUIPMENT

EQUIPMENT

Radiographic and radioscopic equipment	Fixed	CR
		DR
	Mobile	CR
		DR
CT equipment		
Ultrasound equipment		
Mammography equipment		
Magnetic resonance imaging equipment		
Bone densitometry		
PACS		
RIS		

APPENDIX 3: PATHOLOGIES

CARDIOVASCULAR SYSTEM

Aneurism	Angina pectoris
Cardiac arrhythmia	Atherosclerosis
Dextrocardia, situs inversus	Aortic dissection
Embolism	Fistula/arterio-venal malformation
Arterial hypertension	Heart failure
Cardiac insufficiency	Septal malformation
Phlebitis or thrombophlebitis	Stenotic aorta

URINARY SYSTEM

Adenocarcinoma	Anuria
Cancer/metastases	Bladder carcinoma, renal
Renal calculi, vesical/urinary lithiasis	Cystitis
Cystocele/vesical ptosis	Urinary infection
Haematuria	Hydronephrosis
Renal insufficiency	Cysts
Pyelonephritis	Vesicoureteral reflux
Ectopic kidney	Polycystic kidney Wilms tumor
Horseshoe kidney	Ureterocele

ENDOCRINE SYSTEM

Acromegaly	Hypophyseal adenoma
Adrenal insufficiency	Hypothyroidism
Diabetes	Hyperthyroidism

ENDOCRINE SYSTEM

Cushing syndrome	Goiter
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NEUROLOGICAL SYSTEM

Abscess		Head injuries – concussion, contusion, fracture
Cerebro-vascular accident		Headaches
Cancer / metastases		Epilepsy Glioma (glioblastoma, astrocytoma)
Hemorrhage	Cerebral	Hemorrhage
	Subdural	Hydrocephalia
	Subarachnoid	Alzheimer's disease
Transitory cerebral ischemia		Parkinson's disease
Transitory ischemic accident		Medulloblastoma
Huntington's disease		Meningitis
Arterio-venous malformation		Trigeminal Neuralgia
Meningioma		Optical neuritis
Myelomeningocele		Neuroblastoma
Acoustic neurinoma/Schwannoma		Spina bifida
Vestibular/neurinoma		Syringomyelia (Syrinx)
Multiple sclerosis		Downs syndrome

RESPIRATORY SYSTEM

Pulmonary abscess	Adenoids
Asbestosis	Asthma
Atelectasis	Bronchitis
Bronchiectasis	Pulmonary carcinoma
COVID-19 / Coronavirus	Foreign body
Dyspnea	Pulmonary emboli
Pulmonary emphysema	Subcutaneous emphysema
Pleural effusion	Croup/epiglottitis
Cystic fibrosis	Haemothorax
Influenza	Pneumothorax

Pulmonary edema	Chronic obstructive pulmonary disease (COPD)
Pneumonia	Sinusitis
Severe acute respiratory syndrome	

GASTROINTESTINAL SYSTEM

Abscess	Appendicitis
Adenoma	Ascites
Anemia	
Oesophageal atresia	Cancer / Carcinoma
	Colorectal
	Stomach
	Liver
	Esophagus
	Pancreas
Cholelithiasis, choledolithiasis, gallstones	Cholecystitis
Cirrhosis	Foreign objects
Ulcerative colitis	Diabetes
Diverticulitis	Dysphagia
	Gastroenteritis
Tracheo-esophageal fistula	cysts
hemangioma	
Hepatomegaly	Hepatitis
Diaphragmatic hernia	Hiatal hernia
Inguinal hernia	Hyperglycemia, Hypoglycemia
	intussusception
Ileus	Invagination
Crohn's disease	Metastases
Toxic megacolon	Esophageal varices
Intestinal occlusion, occlusive ileus	Pancreatitis
Pneumoperitoneum	Polyps
Gastroesophageal reflux, GERD	Situs inversus
Splenomegaly	steatohepatitis
Hypertrophic pyloric stenosis	Peptic, duodenal ulcer
Volvulus	

SKELETAL SYSTEM

SKELETAL SYSTEM (FRACTURE)

Rheumatoid arthritis	Osteoarthritis	Avulsion	Bennett's
Kyphosis	Hip dysplasia	Greenstick	Bimalleolar
Joint effusion	labral defect	Boxer	Colles
Hemarthrosis	Cystic bone lesion	Comminuted	Complete
Gout	Lordosis	Compression	Contrecoup
Paget's disease	Legg- Perthes Calvé disease	De Maisonneuve	
Multiple myelomas	Avascular necrosis aseptic	De marche	Displaced
Ewing sarcoma	Morton neuroma	Depressed	Hangman
Imperfect osteo genesis	Spondylodiscitis/discitis	Engaged	Intertrochanteric
Osteoporosis	Osteomyelitis	Incomplete	
Osgoode-Schlatter	Spina Bifida	Longitudinal	Le Fort
Scoliosis	Spondylolysis	Multiple	Monteggia
Spondylolisthesis	Subluxation	Open	Oblique
		Pathological	Partial
		Salter-Harris	Blowout, eye socket
		Simple	Non-displaced
		Spiraled (spiroid)	Smith
		Supracondylar	Stress
		Trimalleolar	Transverse

GENITAL, REPRODUCTIVE AND OTHER SYSTEM

Breast adenocarcinoma / breast cancer / Carcinoma in situ of the breast / Fibroadenoma of the breast	Prostate adenocarcinoma / prostate cancer
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GENITAL, REPRODUCTIVE AND OTHER SYSTEM

Cancer	Endometrium	Endometriosis
	Ovaries	
	Testicles	
	Uterus	
Uterine fibroids/ uterine leiomyoma		Hydrosalpinx
Benign prostatic hyperplasia (BPH)		Cysts in breasts, ovaries, testicles
Prostatitis		Salpingitis
		Varicocele

HEMATOPOIETIC SYSTEM

Adenopathy	Leukemia
Lymphoma (hodgkin's and non hodgkin's)	

APPENDIX 4: ABBREVIATIONS, PREFERRED TERMS AND A FEW DEFINITIONS

ORGANISMES

ACTRM / CAMRT	Association canadienne des technologues en radiation médicale
AMC	Association médicale canadienne
BRP	Bureau de la radioprotection
CAR	Association canadienne des radiologistes (Canadian association of radiologists)
CHSLD	Centre d'hébergement de soins de longue durée
CHU	Centre hospitalier universitaire
CIPR	Commission internationale de protection radiologique
CISSS	Centre intégré de santé et services sociaux
CIUSSS	Centre intégré universitaire de santé et services sociaux
CRID	Centre de référence pour investigation désigné
CSSS	Centre de santé et services sociaux
CNESST	Commission des normes, de l'équité, de la santé et de la sécurité du travail
INSPQ	Institut national de santé publique du Québec
LSPQ	Laboratoire de santé publique du Québec
MES	Ministère de l'Enseignement supérieur
MIFI	Ministère de l'immigration, de la francisation et de l'intégration
MSSS	Ministère de la santé et des services sociaux
OQLF	Office québécois de la langue française
OTIMROEPMQ	Ordre des technologues en imagerie médicale, en radio-oncologie et en électrophysiologie médicale du Québec
RSNA	Radiology society of North America

EQUIPMENT, EXAMINATIONS AND RADIATION PROTECTION

AEC	Automatic exposure control
ALARA	As low as reasonably achievable
C-Arm	Mobile radiosopic equipment
CBCT	Cone beam computed tomography or C-arm CT
CR	Computed radiography
CRIP	CR imaging plate
CT	Computed tomography
CTDI	Computed tomography dose index
DFV	Display field of view
DLP	Dose-length product
DR	Digital radiography
DWI	Diffusion Weighted Imaging
ECG	Electrocardiogram
EEG	Electroencephalogram
EMG	Electromyogram
ERCP	Endoscopic retrograde cholangio-pancreatography
ET	Echo time
FLAIR	Fluid attenuated inversion recovery
FSat	Fat saturation
FOV	Field of view
Gy	Gray
HIS	Hospital Information System
HVL	Half-value layer
ICCM	Iodine-containing contrast medium
IPE	Individual protection equipment
kV	kilovolt

EQUIPMENT, EXAMINATIONS AND RADIATION PROTECTION

IT	Inversion time
LSS	Lumbo-Sacral spine
mAs	Milliampere-second
MLC	Multi-Leaf collimator
MLEDD	Memory LED display
MRI	Magnetic resonance imaging
MU	Monitor unit
OAR	Organ at risk
O.R.	Operating rooms
ORD	Object receptor distance
PACS	Picture archiving and communication system
PD	Proton density
PET	Positron emission tomography
PICC-line	Peripherally inserted central catheter
Pitch	Couch movement each 360°/beam width
RIS	Radiology Information System
RT	Repetition time
RX	Radiography
SAR	Specific absorption rate
Scan	Scintigraphy
SE / TSE	Spin echo / Turbo spin echo
SFOV	Scan field of view
SID	Focal spot-to-image receptor distance
SPECT	Single-photon emission computerized tomography
SSD	Focal spot-to-skin distance
STIR	Short T _i inversion recovery

EQUIPMENT, EXAMINATIONS AND RADIATION PROTECTION

SUV	Standard uptake value
Sv	Sievert
T1 / T2	Weighting
TIA	Tilt angle
US	Ultrasonography
WHMIS	Workplace Hazardous Materials Information System
VR / VRT	Volume rendered / volume rendered technique

POSITIONING

AL	Anatomical line
AML	Acanthio-meatal line
AP	Anteroposterior
DorsAL. dec.	Dorsal decubitus
EAM	External auditory meatus
Ext. or Lat.	External or lateral
Int. or Med.	Internal or medial
IO or IPL	Inter-orbital or inter-pupillary line
IOML	Infra-orbitomeatal line
LAO	Left anterior oblique
LAPO	Left anteroposterior oblique
LL	Left lateral external
LLDec.	Left lateral decubitus
LM	Left lateral internal or lateromedial
LPAO	Left posteroanterior oblique
LPO	Left posterior oblique
MCP	Median coronal plane
MPSP	Moving Patients Safety Principles
MSP	Midsagittal plane
OM / CML	Orbitomeatal line / Cantho-meatal line
PA	Posteroanterior
Prone dec.	Prone decubitus
RAO	Right anterior oblique
RAPO	Right anteroposterior oblique
RLDec.	Right lateral decubitus

POSITIONING

RM	Right lateral internal or rolled medially (mammography)
RPAO	Right posteroanterior oblique
RPO	Right posterior oblique

PATHOLOGIES AND CLINICAL INFORMATION

AAA	Abdominal aortic aneurysm
ACL / PCL	Anterior cruciate ligament / posterior cruciate ligament
ANV	Nausea / Vomiting
APN	Acute pyelonephritis
ARDS	Acute respiratory distress syndrome
ARDS	Adult respiratory distress syndrome or acute respiratory distress syndrome
ASHD	Atherosclerotic heart disease
ATB	Antibiotic
BhcG	Beta chorionic gonadotropin
bid	Twice daily
BMI	Body mass index
BP	Blood pressure
BPH	Benign prostatic hypertrophy
bpm	Beats per minute
BUD	Beyond use date
bx	Biopsy
COPD	Chronic obstructive pulmonary disease
CPR	Cardiopulmonary resuscitation
CSF	Cerebrospinal fluid
CVA	Cerebrovascular accident, stroke
De novo	Anew / again
DHS	Dynamic hip screw
DLMP	Date of last menstrual period
Dx	Diagnosis
eGFR	Estimated glomerular filtration rate
eRPF	Effective renal plasma flow

PATHOLOGIES AND CLINICAL INFORMATION

FB	Foreign body
Fx	Fracture
GERD	Gastro-esophageal reflux
GFR	Glomerular filtration rate
GOC	Glioma optical channels
HBP	High blood pressure
HIV	Human immunodeficiency virus
HR	Heart rate
HV	Hepatitis virus (A & E)
Hx	History, background
ICU	Intensive care unit
INR	Internal Normalized Ratio
Insp / exp (I: E)	Inspiration / expiration
ISO	Patient in isolation
Kg or lbs	Weight in kilogram or pound
LBB	Left bundle-branch
LE	Lower extremity
LIF	Left iliac fossa
Lux	Luxation
MRSA	Methicillin-resistant Staphylococcus aureus
MS	Multiple sclerosis
Neo	Neoplasia
OA	Osteoarthritis
od	Once daily
OOP	Out of Plaster
ORIF	Open reduction and internal fixation

PATHOLOGIES AND CLINICAL INFORMATION

ORSA	Oxacillin-resistant Staphylococcus
OVT	Keep open vein or ovarian vein thrombosis
P	Pain
PACVC	Peripheral access central venous catheter
PCAV	Possible child abuse victim
PE	Pulmonary embolism
Peri op	During the operation
PO	By mouth
Post op	After the operation
PPM	Permanent pacemaker
Pre op	Before the operation
Prev	Previous
prn	As needed
PSA	Prostate specific antigen
P time / pro time	Prothrombine time
PTT	Thromboplastin time or activated cephalon time
R/O	Rule out
RA	Rheumatoid arthritis
RIF	Right iliac fossa
RM	Red bone marrow
ROH	Alcohol intoxication
RR	Respiratory rate
RSP	Retrosternal pain
SIJ	Sacro-iliac joint
S/P	Status post
SAH	Subarachnoid hemorrhage

PATHOLOGIES AND CLINICAL INFORMATION

SARS	Severe acute respiratory syndrome
SDH	Subdural hemorrhage
SO ₂	Blood oxygen saturation
ST	Stress test
STAT	Immediately, urgently
STST	Submaximal treadmill stress test
Sx	Surgery
TB	Tuberculosis
TFN	Trochanter femoral nail
THR	Total hip replacement
TIA	Transient ischemic attack
TKR	Total knee replacement
T / L	To level
TNM	T (primary tumour); N (metastatic lymphatic nodule); M (metastasis)
TP	Thrombophlebitis
TST	Tuberculin skin test
Tx	Treatment
UE	Upper extremity
w/r	With respect to

APPENDIX 5: PHARMACEUTICAL PRODUCTS

N.B: Does not apply to modalities in sections B, D, G, H et I of the current document.

PRODUCT AND MEDICATION CATEGORIES

Antagonists / Antidotes
Anesthetics
Beta blockers
Anticoagulants
Antihistamines
Antidiabetics
Anti peristaltic
Bronchodilators
Cathartics/laxatives
Contrast media and enhancing agents
Corticosteroids - anti-inflammatory
Diuretics
Fluids and electrolytes
Hypoglycemic
Narcotics/analgesics/tranquilizers/anxiolytic/sedative
Vasodilators
Vasopressors / Adrenergic

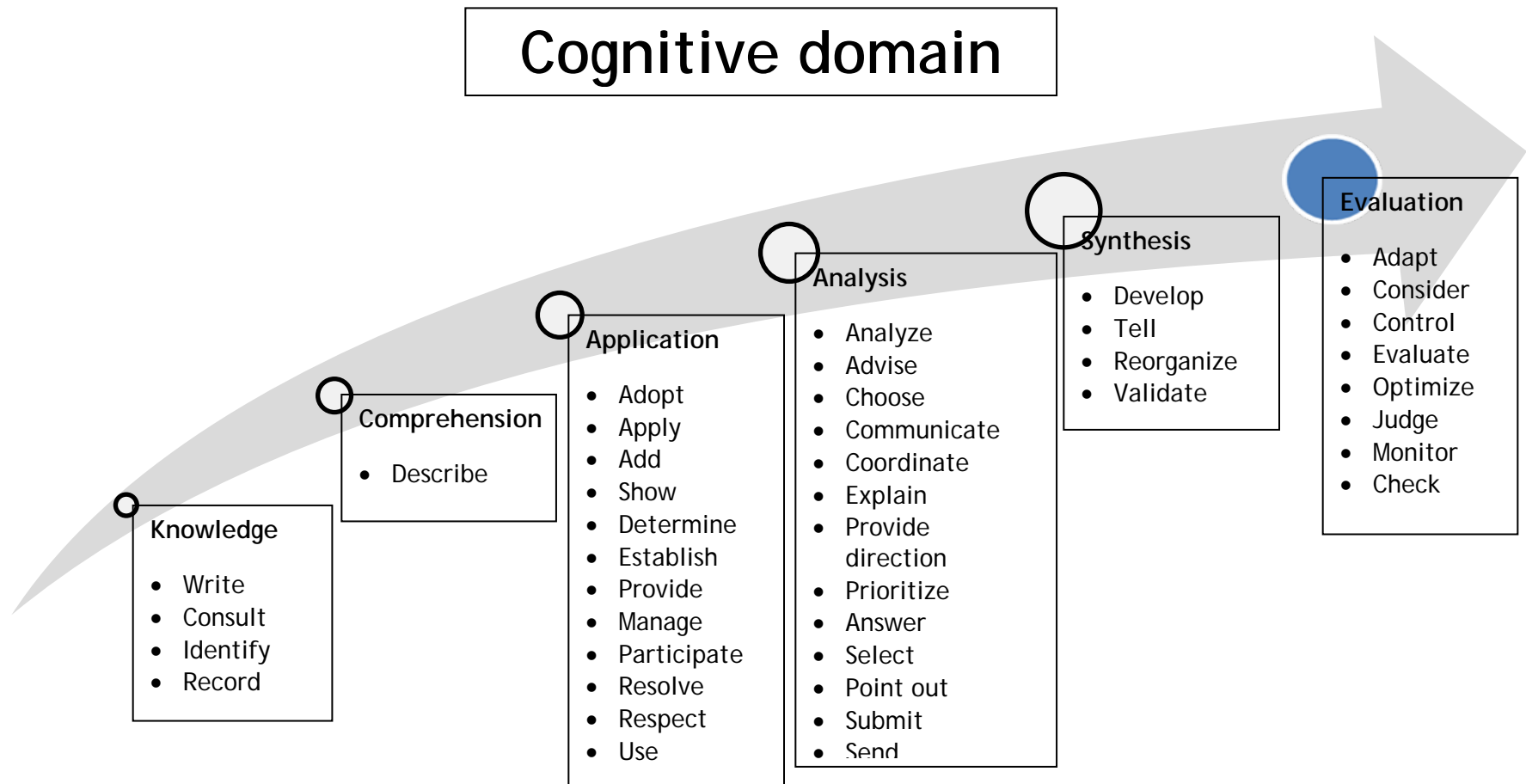
A FEW DEFINITIONS

Analysis	Separation of the elements or components of a communication in order to clarify the relative hierarchy of ideas and/or relationship between the ideas expressed. The purpose of these analyses is to elucidate the communication, its organization, the means used to achieve the goal sought and the bases on which it was developed and arranged (Legendre, 2005, p.1350).
Application	Use of abstract representations in specific and concrete cases. These representations can take the form of general ideas, rules of procedure or widely used methods, or of principles, ideas and theories that must be remembered and applied (Legendre, 2005, p.1350).
Competency attainment	According to CMA (2008), integration of knowledge, skills, attitudes and judgement in real clinical situations that require problem-solving, communication and critical thinking to address patient needs and conditions.
Competency:	According to the Quebec Ministry of Education, Recreation and Sport (2006), a competency is defined as “an acting knowledge based on the effective mobilization and use of a set of resources” (p.4). According to LeBoterf (2008) “To be competent is to be able to act and succeed competently in a work situation (activity to be carried out, event to be faced, problem to be solved, project to be carried out...). It means implementing a relevant professional practice while mobilizing an appropriate combination of resources (knowledge, skills, behaviours, reasoning methods, etc.) (p.21). According to Scallon (n.d.), “to be said to be “competent,” an individual must have done something: production, process, and process on several occasions.” It also defines competence as “the ability to mobilize a set of resources (internal (knowledge, skills, strategies, skills) and external (documents, experts, Internet, other students)) in order to deal with a complex set of situations».
Comprehension	The most basic level of understanding. This intellectual understanding or apprehension allows the student to know what is being transmitted to them and to use the material or ideas that are being communicated to them without necessarily establishing a link between this material and another or grasp its full scope. (Legendre, 2005, p. 1350)
Entry-level competency	Skills required for a technologist entering the profession on day 1.
Evaluation	Making judgments about the value of materials and methods used for a specific purpose. Qualitative or quantitative judgment of the extent to which equipment and methods meet the criteria (Legendre, 2005, p. 1350)

A FEW DEFINITIONS

Knowledge acquisition	Knowledge involves the recall of particular and general facts, methods and processes, or a reminder of a model, structure or order. In measuring knowledge, recall behaviour requires little more than resurrecting stored materials in memory. (Legendre, 2005, 1349)
Prescription	The term “prescription” means an individual or group prescription made by a professional authorized by law, having as its subject in particular the medicines, treatments, examinations and care required, the circumstances in which they may be issued, as well as possible contraindications. (Professional Code: section 39.3).
Skills and attitudes	A technologist who demonstrates a good professional attitude acts according to his or her ability to perform in all the elements necessary for competence (OTIMROEPMQ, 2010).
Synthesis	The combining of the constituent elements and parts into a single entity. This operation consists disposing and combining the fragments, parts, elements, etc. in such a way as to form a plan or structure that was not previously clearly visible. (Legendre, 2005, p. 1350)
Taxonomy of the affective domain	Hierarchical set of objectives related to attitudes, interests, values, appreciations, emotions, feelings and the ability to adjust. (Legendre, 2005, p. 1347)
Taxonomy of the cognitive domain (Bloom)	Educational model proposing a hierarchical classification of levels of knowledge acquisition. These levels are organized from the simple restitution of facts to the complex manipulation of concepts that is often implemented by the so-called higher cognitive faculties. It can be summarized into six levels, each higher level encompassing the previous levels. According to Legendre (2005), it is a hierarchical set of objectives, concerning on the one hand the acquisition of knowledge and, on the other hand, the acquisition of skills and intellectual capacities that allow the use of this knowledge.
Taxonomy of the psychomotor domain	Hierarchical set of objectives related to motor skills, object manipulation, muscle coordination and body movements. (Legendre, 2005, p. 1356)

APPENDIX 6 : TAXONOMY



Affective domain

Competencies

Ensure the patient's comfort and safety
Contribute, collaborate with other professionals
Keep an eye and an ear on patient
Preserve the patient's dignity, keep a clean and safe environment
Reassure the patient
Ensure patient's consent
Introduce oneself to patient

Psychomotor domain

Competencies

Administer
Act / React / Take action
arrange
Calculate
dispense care
Dispose of objects, waste...
Perform / Carry out / Execute
Elute / Calibrate
Record
Store
Send / Ship / Receive
intervene
Limit
Handle
Mark
Position
Collect / Withdraw
Take
Prepare work sites, material...
Prevent infections from spreading
Proceed
produce
Treat
Transfer patients, objects...

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