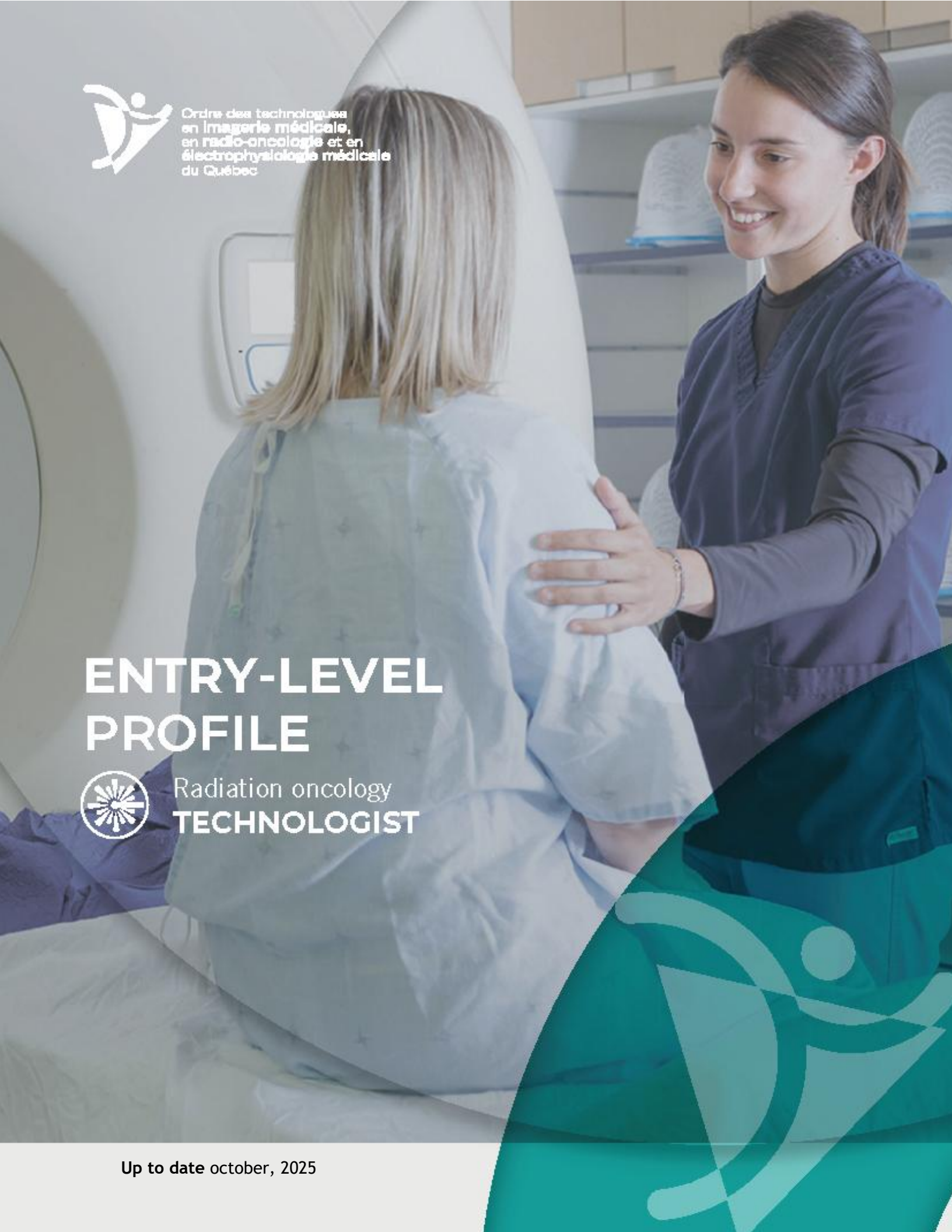

Ordre des technologues en imagerie médicale, en radio-oncologie et en électrophysiologie médicale du Québec

ENTRY-LEVEL PROFILE

Radiation oncology TECHNOLOGIST

Up to date october, 2025

Ordre des technologues en imagerie médicale,
en radio-oncologie et en électrophysiologie médicale du Québec
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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 Radiation Oncology technologist 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 that serves as an orientation for future technologists in their preparatory journey in obtaining their permit to exercise the profession. It also serves as a guide for the drafting of 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 to evaluate the ability to integrate theoretical knowledge into clinical 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 Radiation Oncology Technology program prepares students to practice the profession of radiation oncology technologist.
>
> The only people authorized to use the title of Radiation Technologist are those who hold a licence to practice and are members of the Ordre des technologues en imagerie médicale, en radio-oncologie et en électrophysiologie médicale du Québec (OTIMROEPMQ). The Diploma of College Studies (DCS) in Radiation Oncology Technology awarded by the Ministère de l'Éducation et de l'Enseignement supérieur is a prerequisite for taking the certification exam.
>
> Radiation oncology technologists are healthcare professionals who work in a radiation oncology department within a hospital centre. Their role is directly linked to treating cancer and certain benign conditions following the prescription of a radiation oncologist. Their responsibilities mainly consist of planning the treatment in accordance with the prescription and administering external radiation treatments.

> Managing patients who are undergoing treatment is a key component of professional practice. Radiation oncology technologists use various specialized software programs to capture, input and transmit information and images concerning patients and their treatments. Adjustments made as a result of analyzing images allow radiation oncology technologists to optimize the treatment plan. Clinical judgement is crucial to the performance of every one of their tasks. (Gouvernement du Québec, 2018, p.13).

This document has been updated to reflect the current Canadian Association of Medical Radiation Technologists (CAMRT) Competency Profile and the 2012 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 to perform all tasks relating to the planning and treatment of patients. The detailed competencies are then grouped by theme. Please note that emphasis is placed on the critical thinking and technical actions that a radiation oncology technologist entering the profession must develop to work in partnership with the patient and other healthcare professionals in the multidisciplinary team. The proficiency level was established in function of Bloom's taxonomy (see Appendix 2).

Finally, at the end of this document, you will find two appendices (abbreviations and terms to be used and the Bloom's 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 radiation oncology technologists and applies to all sections of this document.

AUTONOMY

- Fulfill all professional responsibilities according to the prescription
- Demonstrate initiative (anticipate tasks to be accomplished)
- Make decisions to be effective in all situations (judgement, medical emergencies, machine breakdown…)
- Recognize one's limits and be able to seek help from the appropriate resources in order to properly manage any given situation
- Demonstrate good clinical judgement
- Be organized, responsible and methodical

ADAPTATION AND MULTIDISCIPLINARY INTEGRATION

- Establish a relationship of trust with the various healthcare professionals involved in the patient's care (other technologists, radiation oncologists, nutritionists, nurses…)
- Speak using appropriate medical terminology during interdisciplinary and multidisciplinary clinical discussions
- Become a part of the work team (adapt to the way co-workers and supervisors do things, adapt to the interdisciplinary and multidisciplinary teams…)
- Establish a relationship of respect with peers and the multidisciplinary team (physics team, biomedical engineering team, information technology (IT) team…)
- Adapt to changes (team, technological advances, new protocols and specialties…)
- Develop stress management and conflict management strategies

VERBAL AND NON-VERBAL COMMUNICATION

- Have the ability to communicate clearly, precisely and adapted to colleagues and patients
- Create a relationship of trust with colleagues, other medical professionals, and patients
- Is empathetic, patient, respectful and available
- Demonstrate openness towards others (patients, co-workers…) and a capacity to listen effectively
- Control one's emotions towards co-workers and patients while performing daily tasks
- Conduct oneself professionally when communicating verbally and non-verbally
- Express oneself in a constructive manner

COMMITMENT TO THE PROFESSION

- Show interest and motivation (promote the profession, demonstrate a positive attitude, think critically with respect to one's actions…)
- Demonstrate intellectual and scientific curiosity in one's area of practice (follow medical news and technological advances, participate in committees…)
- Keep one's knowledge up to date (participates in conferences, attends training following software updates
- Show attention to detail, be meticulous
- Demonstrates rigor and transparency

RULES, ETHICS AND CODE OF ETHICS

- Demonstrate ethical behaviour
- Comply with various laws, regulations, rules and standards
- Respect confidentiality, de discrete
- Adopt safe working behaviors towards the patient, co-workers, and one-self

COMPETENCY STATEMENTS

A – PROFESSIONAL PRACTICE

N.B. The competency "Professional Practice" is intrinsic to the routine practice of radiation oncology 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 material when prioritizing examinations
(review the patient's care plan, communicate with other health professionals responsible for the patient, ensure the material is available…)

1.2 Consider all possible elements that could influence the completion of planning and treatment
(patient's condition, general and physiological anatomy, imaging, pathology, diagnosis, prescription, previous exams and treatments, research protocols…)

1.3 Adapt procedures based on elements influencing planning and treatment
(type of treatment machines (e.g. Tomotherapy vs LINAC) and their associated techniques…)

1.4 Optimize outcomes based on the work context, while respecting the protocols of the establishment to ensure optimal quality of the services provided to patients

1.5 Determine the purpose of the procedure

1.6 Apply problem-solving strategies
(analyse the situation, refer to technical documents and relevant resources…)

1.7 Apply stress management techniques
(maintain one's capabilities and efficiency…)

1.8 Apply conflict resolution techniques
(demonstrate a cooperative and neutral behavior, be diplomatic and professional…)

A-2 : DEMONSTRATE PROFESSIONAL BEHAVIOUR

2.1 **Practice in accordance with legislation, rules, and current standards of practice** (demonstrate discretion, respect confidentiality, adopt a professional attitude, respect the dress code of the clinical environment…)
2.2 Act only according to an individual or collective prescription signed by a professional qualified to do so by the law
2.3 **Demonstrate an attitude that is compliant with the standards of professional conduct** (avoid private conversations among colleagues, avoid giving impressions or making inappropriate comments and remarks, preserve the patient's dignity…)
2.4 **Show respect and sensitivity in interactions with the patient and other professionals** (stress management, conflict resolution, adapting to change in the work environment…)
2.5 **Prepare the examination room, 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, minimize travel for the patient…)
2.7 **Continually participate in 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 work station runs smoothly**
2.10 **Collaborate between professionals by establishing good communication, exchanging relevant information and completing tasks in the interest of the patient**
2.11 **Communicate to the appropriate healthcare professionals relevant information that may be useful to them when reviewing the patient's chart and meeting with the patient**
2.12 **Help update technical procedures**
2.13 **Participate in the development of new planning and treatment techniques**
2.14 **Add one's electronic signature to sign off on information and comments appearing on the patient's chart or an electronic request**

A-3 : CONTRIBUTE TO TRAINING AND PRACTICAL INSTRUCTION

3.1 **Explain the general functioning of the department**
3.2 **Explain the planning CT and treatment**
3.3 **Explain the functioning of the treatment machines and equipment**
3.4 **Participate in theoretical and practical teaching**
3.5 **Participate in the evaluation process of those in training**

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 the standards for occupational health and safety and the quality assurance program**
(WHMIS, PDSP, OH&S, globally harmonized system (GHS)…)

1.2 **Apply the establishment's emergency measures plan**
(emergency codes, incidents…)

1.3 **Validate the check of both the emergency cart and tray**
(expiry date, product integrity, location, understanding the contents…)

1.4 **Handle biomedical, chemical and pharmaceutical waste according to established standards**

1.5 **Report issues related to any faulty equipment or material**

1.6 **Maintain a clean and safe work environment**

1.7 **Check safety devices**
(door interlock, emergency buttons…)

1.8 **Ensure proper storage of equipment and material**
(positioning and immobilization accessories, protective equipment such as lead aprons, patient care material such as oxygen equipment or dressings…)

1.9 **Record any event related to an incident or accident**
(patient chart, register, AH-223 form…)

B-2 : MANAGE RISKS ASSOCIATED WITH THE PATIENT

2.1 Apply sterile work methods
2.2 Provide clinical care related to treatment and planning
2.3 Apply the appropriate measures in emergency situations
(take patient's vital signs, CPR, emergency measures …)
2.4 Monitor the parameters for ancillary devices
(sphygmomanometer, oxygen, pulse oximeter, volumetric pump…)
2.5 Apply immobilization techniques adapted to the patient's age and condition
2.6 Utilize safe transfer techniques based on the patient's condition
(PDSP, transfer in fracture cases or patient with limited mobility…)
2.7 Handle accessories in a way that does not harm the patient
(IV saline solution bag, oxygen, catheters…)
2.8 Ensure patient comfort and safety
(immobilization accessories, blanket, pillow, cervical collar, stretcher side rails...)
2.9 Maintain visual and auditory contact with the patient at all times
(avoid injuries, ensure radiation protection, ensure clinical monitoring…)
2.10 Follow preventative procedures for patients that are immunosuppressed
2.11 Apply established measures to control risks that could harm the patient
(human error, mechanical defects, technological breakdown, contingency plan…)
2.12 Record data in the patient's chart
(technical factors, patient's condition, pregnancy, contrast medium, allergy, incident, accident, AH-223 form…)

B-3 : APPLY ERGONOMIC PRINCIPLES

3.1 Adopt an ergonomic working posture
3.2 Use ergonomic transfer techniques for moving patients or equipment
3.3 Maintain a safe and ergonomic work area

B-4 : INFECTION CONTROL

4.1 Handle sharp or pointed objects, contaminated material and biomedical waste safely

4.2 Dispose of sharp or pointed 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 linens and sheets, washing hands, wearing gloves, gown, and a mask (PPE)…)

4.4 Prevent the transmission of infections by applying additional precautions according to the established procedures
(personal protection equipment (PPE), N95 mask…)

4.5 Apply infection control techniques to prevent the transmission of microorganisms for equipment and examination rooms
(disinfecting equipment and accessories, washing the treatment table…)

4.6 Prioritize actions based on infection prevention

C – PERFORM QUALITY CONTROL

N.B. Quality control also applies to each point described in sections **F, G, I and J** of the current document.

C-1 : ASSESS THE PERFORMANCE OF EQUIPMENT

1.1 Apply one's knowledge to operate equipment properly

1.2 Apply quality control measures according to the manufacturer's schedules
(manufacturer's specifications, 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 in the event of a test irregularity
(stop the procedure, advise the coordinator, change the parameters…)

1.6 Contribute to the development and updating of technical files, quality control procedures and maintenance procedures
(monitors, work stations…)

1.7 Perform a daily general inspection of each device

D – PATIENT MANAGEMENT

N.B. Patient management also applies to each point described in sections **F, G, I and J** of this document.

D-1 : GREET PATIENTS IN A PROFESSIONAL MANNER

1.1 Verify the patient's identity using at least two means of identification
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, or consult, with an interpreter
1.4 Evaluate the patient's cognitive, physical and mental condition
1.5 Validate patient preparation
1.6 Establish a climate of trust
(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 prescription for the planning CT or treatment to be performed
1.9 Act in accordance with the code of ethics to avoid any behaviour that would be open to interpretation or imply 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 PRESCRIPTION AND CHART

2.1 Verify the conformity of the prescription
(signature, relevance of the requested examination, contraindications, any missing data, patient's name, date…)
2.2 Analyze the information on the prescription in preparation for carrying out the planning CT or treatment
(clinical information, examination requested…)
2.3 Prepare the patient's chart based on the prescribed planning CT and treatment
2.4 Verify the patient's radiotherapy chart and the medical chart
2.5 Demonstrate an understanding of reports and prior imaging from related disciplines
(CT, MRI, PET scan, ultrasounds, pathology report…)
2.6 Correct any mistakes that may have been made in the patient's chart
2.7 Ensure confidentiality when collecting information relevant to the planning CT and treatment
(medical history questionnaire, medical and radiological chart, preparation…)

D-3 : EXPLAIN THE PLANNING CT OR TREATMENT TO THE PATIENT

3.1 Explain the planning CT or treatment accurately and tailored to the patient's condition and information needs
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 with respect to the planning CT and treatment
(medical history questionnaire, pregnancy…)
3.4 Describe the sequence of events that will take place during the planning CT and treatment
3.5 Teach the appropriate care according to the site to be treated
3.6 Provide instructions and guidelines to ensure a successful planning CT and treatment
3.7 Reassure the patient with regards to the role, proximity and movements of the machine
3.8 Provide instructions for radiation protection
3.9 Answer the patient's questions
3.10 Validate the patient's understanding
3.11 Communicate to the patient information relating to the follow-up of their care
3.12 Have the patient remove any object or clothing that may compromise the quality of the planning CT or treatment
3.13 Ensure that the patient agrees to having the planning CT and treatment

D-4 : MANAGE PRIORITIES

4.1 Establish and update the order of priorities and the room's work schedule in a logical fashion
4.2 Ensure patients are available and prepared as required
4.3 Advise any other involved services to prepare patients and synchronize procedures
4.4 Reorganize the work schedule taking emergencies into consideration
(emergency, intensive care patients…)
4.5 Coordinate patient transport

D-5 : ENSURE PATIENT RADIATION PROTECTION

5.1 Apply techniques and work methods that reduce radiation exposure (ALARA) while ensuring the quality of the planning CT or treatment
(patient preparation, technical parameters, positioning, beam collimation, patient is of childbearing age, lead apron…)

5.2 Apply knowledge of the effects and risks associated with ionizing radiation

5.3 Help teach radiation protection measures required for the safety of patients, the environment, the general public, and other health care professionals

5.4 Provide clear instructions to the patient on the importance of proper positioning in order to optimize their radiation protection

5.5 Provide the patient with information useful for their protection and that of others

5.6 Apply the necessary radiation protection measures to ensure the safety of the environment, the general public and other healthcare professionals
(close the door to the room…)

5.7 Evaluate the need to repeat the planning CT

5.8 Identifier le rôle des différentes instances en radioprotection
(Canadian Nuclear Safety Commission, Health Canada (Radiation Protection Bureau), safety code 35 …)

5.9 Follow the National Dosimetry Services (Health Canada) guidelines for the proper use of and precautions to take with dosimeters
(caring for and wearing the personal dosimeter in accordance with the radiation protection program and regulations in force)

D-6 : ENSURE PATIENT FOLLOW UP

6.1 Coordinate and confirm the patient's various appointments

6.2 Record relevant observations and data in the patient's chart
(progress notes, technical notes, …)

6.3 Communicate important information to the relevant medical professionals

6.4 Provide the patient with appropriate instructions and recommendations to follow after the planning CT and treatments

6.5 Refer the patient to the appropriate available services and resources
(explanatory documents, other medical professionals such as a nurse, social worker, or nutritionist, CLSC…)

6.6 Give appropriate post-planning or post-treatment recommendations

6.7 Ensure the patient receives follow up

E – APPLY KNOWLEDGE RELATED TO HUMAN BODY SYSTEMS AND PRINCIPLES OF CLINICAL ONCOLOGY

E-1 : DEMONSTRATE AN UNDERSTANDING OF SYSTEMS AND GENERAL ONCOLOGY

1.1 Apply knowledge of human anatomy and physiology
1.2 Apply knowledge of cancerous tumours, their mechanisms of spread, and their staging (TNM…)
1.3 Apply knowledge of radiobiological effects and the radiosensitivity of human tissues
1.4 Apply knowledge related to the side effects of various treatment modalities

F – CARRY OUT TREATMENT PLANNING

N.B. For each of the following points, the work processes described in the previous sections **A, B and C** apply at all times. This section describes the specific aspects of treatment planning only.

F-1 : CHOOSE AND MAKE POSITIONING AND / OR IMMOBILIZATION ACCESSORIES

1.1 Optimize the patient's position to ensure that the area to be treated is readily accessible (accuracy and reproducibility…)
1.2 Use anatomical landmarks to align and position the patient
1.3 Analyze the impact of using different immobilization techniques
1.4 Make the immobilization accessories
1.5 Adjust immobilization accessories, if necessary
1.6 Take a photo of the positioning, if applicable
1.7 Identify and label immobilization accessories
1.8 Record the information in the patient's chart

F-2 : FABRICATE BEAM MODIFYING ACCESSORIES

2.1 Apply the safety rules in force, wear appropriate equipment, use safe material and ensure the safety of the patient at all times
2.2 Fabricate electron cut-outs and attenuators
2.3 Prepare or make the bolus

F-3 : ADMINISTER CONTRAST MEDIA AND DRUGS

3.1 Verify all the material used for injections and report any irregularity that could compromise the quality of the procedure
(expiry date, integrity of the substance…)

3.2 Select the material specifically intended for each of the various procedures
(puncture, perfusion, injection …)

3.3 Perform the medical history questionnaire and manage contraindications

3.4 Consider the pharmacological effects of the administered drugs and their interactions

3.5 Administer contrast media and drugs according to established procedures
(use the power injector …)

3.6 Intervene appropriately in the case of an adverse reaction to contrast media or drugs
(extravasation, allergies…)

3.7 Perform the installation and removal of an intravenous (IV) catheter

F-4 : USE VARIOUS IMAGING DEVICES TO CARRY OUT PLANNING

4.1 Select the appropriate procedure and technical parameters for the patient's position

4.2 Position the patient according to the area being treated in order to either the optimize treatment or according to the position that was determined in previous steps

4.3 Position the appropriate markers on the patient

4.4 Produce images and slices that meet essential planning criteria, including the anatomical structures to be treated as well as any critical structures in the area

4.5 Optimize the quality of the planning
(visualization of anatomical structures, image quality, image processing, contrast media, air, liquid, bolus, markers…)

4.6 Mark and/or tattoo the reference points on the patient
(tattoos, drawings…)

F-5 : PERFORM PLANNING USING COMPUTED TOMOGRAPHY (CT)

5.1 Select the appropriate imaging protocol based on the requested examination

5.2 Enter the information needed to perform the examination into the computer
(patient demographics, patient orientation, the name of the radiation oncologist, the name of the technologist performing the examination…)

5.3 Perform centering using the lasers in such a way that:
- The initial point of the pilot image (topogram) is based on the region being treated
- The structures of interest are projected in the centre of the screen (adjust field of view)
- The pilot image covers the region of interest only

5.4 Accurately select the parameters and slices (region of interest) to be acquired according to the established procedure

5.5 Apply the protocols for image processing and reconstruction

5.6 Manipulate the digital images appropriately in order to enhance or maintain examination quality

5.7 Ensure follow-up of the acquired images
(relevant data, transferring the images, archiving (PACS)…)

F-6 : PERFORM PLANNING USING MRI

6.1 Apply all safety standards associated with the MRI
(controlled access to the room, ferromagnetic objects, consent form…)

6.2 Apply knowledge of the effects and risks associated with the magnetic field

6.3 Select the appropriate protocol and coil for the examination and use the them according to the manufacturer's specifications
(flat planar coil, intracavity coil…)

6.4 Select the slices (region of interest) to be acquired according to the established procedure

6.5 Acquire the images

6.6 Evaluate the quality of the image sequences
(contrast, resolution, noise, movement, artifacts, adequate anatomical coverage…)

6.7 Reconstruct the images according to the established procedure
(2D, 3D)

6.8 Ensure follow-up of the acquired images
(relevant data, transfering the images, archiving (PACS)…)

G – PERFORM DOSIMETRY PLANNING

N.B. For each of the following points, the work processes described in the previous sections **A, B and C** apply at all times. This section describes the specific aspects of dosimetry only.

G-1 : PRODUCE AN OPTIMAL DOSIMETRY BASED ON THE TECHNICAL PARAMETERS ESTABLISHED DURING THE PLANNING CT

1.1 **Analyze all imaging while taking tissue heterogeneity into account**
(X-ray, CT, MRI, PET, any contrast media administration …)

1.2 **Contour (outline) the anatomical structures and organs at risk (OAR) for the dosimetric calculations according to the protocol**

1.3 **Determine the beam geometry while taking into account the physical limitations of the treatment machine and any previous treatments the patient may have had**
(reference point, isocenter, incidences, beam collimation…)

1.4 **Determine the parameters for an optimal dose distribution**

1.5 **Analyze the dosimetry plan in consultation with the radiation oncologist**

1.6 **Finalize all necessary documents prior to beginning treatments**

1.7 **Perform calculations for various radiation therapy procedures**

1.8 **In the event that the patient has previously received treatment in the same area, compile the previous doses and adapt the plan according to the tolerance dose of critical organs**

1.9 **Ensure follow-up of the dosimetry plan**
(second verification, transfer of the plan and follow-up with the different clinical sectors…)

I– PERFORM EXTERNAL BEAM RADIATION THERAPY TREATMENTS

N.B. For each of the following points, the work processes described in the previous sections **A, B, C and D** apply at all times. This section describes the specific aspects of external beam radiation therapy only.

I-1 : POSITION THE PATIENT

1.1 Reproduce all aspects of the patient's position and setup at the time of the planning CT
(physical preparation of the patient, patient positioning, use of standard and personalized positioning and immobilization accessories…)

1.2 Use beam modifying accessories as planned

1.3 Verify the patient's position through the use of various imaging modalities
(CBCT, kV/kV, portal imaging (MV), surface guided radiotherapy (SGRT), respiratory monitoring such as in deep inspiration breath hold (DIBH) technique …)

1.4 Analyse the images and perform image matching before carrying out any necessary adjustments
(make compromises while respecting planned tolerances, modify the treatment plan as a result of changes in patient anatomy or physiology, as necessary…)

I-2 : POSITION THE TREATMENT MACHINE

2.1 Verify that the treatment machine and beam parameters correspond with the treatment plan, prior to the start of irradiation
(reference field, treatment field…)

2.2 Use the required measurement tools to ensure precision
(ruler, optical distance indicator (ODI) …)

2.3 Use good judgment when there are changes from the treatment plan

2.4 Ensure that there is no risk of collision before beginning treatment

I-3 : CHECK DATA

3.1 Verify that the parameters manually entered into the record and verify system correspond with the planning parameters

3.2 Verify the computer parameters before each irradiation (beam on)

I-4 : PERFORM IRRADIATION

4.1 Produce and analyze radiological verification images

4.2 Deliver the treatment as prescribed by the radiation oncologist

4.3 Apply radiation protection and safety principles using methods that are appropriate for the given situation
(using the cameras, constantly monitor the patient to ensure their position and that they stay immobilized during treatment, monitor the treatment console where the beam parameters are displayed until treatment ends…)

4.4 Compile and sign off on treatment doses daily

4.5 Follow the treatment plan diligently while being aware that the patient's anatomy may change significantly over the course of treatments (e.g., weight loss) thus compromising dose delivery and treatment

I-5 : ENSURE FOLLOW-UP OF THE PATIENT'S CHART

5.1 Ensure the approval of images according to the department's protocol

5.2 Ensure follow-up of information and materials with other healthcare professionals

5.3 Ensure daily monitoring of variations in the patient's condition and record it in the chart

5.4 Ensure daily monitoring of variations in technical parameters and enter it in the chart
(source to skin distance (SSD), variations in beam parameters …)

5.5 Perform weekly patient chart reviews / QA

J – APPLY KNOWLEDGE RELATED TO BRACHYTHERAPY

N.B. For each of the following points, the work processes described in the previous sections **A, B, C and D** apply at all times. This section describes the specific aspects of brachytherapy only.

J-1 : DEMONSTRATE KNOWLEDGE OF BRACHYTHERAPY PLANNING AND TREATMENT TECHNIQUES

1.1 Apply knowledge related to brachytherapy planning and treatment
(indications, contraindications, procedures, in conjunction with external radiotherapy…)

1.2 Apply knowledge relating to the different sources used in brachytherapy
(high dose rate (HDR), implants…)

1.3 Apply knowledge regarding radiation protection

1.4 Apply knowledge regarding the side effects of different types of brachytherapy treatments

1.5 Apply knowledge of the equipment and accessories used in brachytherapy
(working methods, principles of sterilization, principles of asepsis, operation…)

1.6 Communicate appropriate instructions and recommendations to the patient to follow before, during and after brachytherapy planning or treatment

1.7 Demonstrate an understanding of the care to be provided depending on the type of brachytherapy being administered

Appendix 1 : Abbreviations, terminologies and a few definitions

ORGANIZATIONS

AMSMNQ	Association des médecins spécialistes en médecine nucléaire du Québec
CAMRT	Canadian association of Medical Radiation Technologists
CAR	Canadian Association of Radiologists
CHU	University hospital centres
CHSLD	Residential and long-term care centres
CISSS	Integrated health and social services centres
CIUSSS	Integrated university health and social services centres
CMA	Canadian Medical Association
CNSC	Canadian Nuclear Safety Commission
CNESST	Commission des normes, de l'équité, de la santé et de la sécurité du travail
FIGO	International Federation of Gynecoloy and Obstetrics
ICPR	International Commission of Radiological Protection
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
RPB	Radiation Protection Bureau
RSNA	Radiology society of North America

EQUIPMENT, EXAMINATIONS AND RADIATION PROTECTION

AEC	Automatic exposure control
ALARA	As Low As Reasonably Achievable
Bq	Becquerel
C+ C-	Planning CT with or without contrast
CBCT	Cone beam computed tomography
CT	Computed tomography
CT-sim	Computed tomography simulation
CR	Computed radiography
CTDI	Computed tomography dose index
CTV	Clinical target volume
DFOV	Display field of view
DIBH	Deep inspiration breath hold
Dmax	Depth of dose maximum
DLP	Dose-length product
DR	Digital radiography
DVH	Dose volume histogram
FSSD	Focal spot-to-skin distance
ECG	Electrocardiogram
EEG	Electroencephalogram
EMG	Electromyography
FFF	Flattening filter free
FOV	Field of view
GTV	Gross tumour volume
Gy	Gray

EQUIPMENT, EXAMINATIONS AND RADIATION PROTECTION

HDR	High dose rate brachytherapy
HVL	Half value layer
ICCM	Iodine-containing contrast medium
IGRT	Image guided radiotherapy
IMRT	Intensity modulated radiotherapy
ITV	Internal target volume
KeV	Kiloelectron-volt
kV	Kilovolt
LDR	Low dose rate brachytherapy
mAs	Milliampere-seconds
mCi	Millicurie
MLC	Multileaf collimator
MRI	Magnetic resonance imaging
MU	Monitor unit
MV	Megavolt
OAR	Organ at risk
PACE	Pacemaker
PACS	Picture archiving and communication system
PET	Positron emission tomography
PICC-line	Peripherally inserted central catheter
PRV	Planning organ at risk volume
PSP	Photostimulable phosphor plates
PTV	Planning target volume
RX	Radiography
SGRT	Surface-Guided Radiation Therapy
SAD	Source axis distance

SBRT	Stereotactic body radiotherapy

EQUIPMENT, EXAMINATIONS AND RADIATION PROTECTION

Scan	Scintigraphy
SIR/RIS	Radiology information system
SPECT	Single-photon emission computerized tomography
SRS	Stereotactic radiosurgery
SUV	Standardized uptake value
Sv	Sievert
TB	Tumour bed
TBI	Total body irradiation
TV	Target volume
US	Ultrasonography
VMAT	Volumetric modulated arc therapy
WHMIS	Workplace Hazardous Materials Information System
4DCT	Four-dimensional computed tomography

POSITIONING

AL	Anatomical Line
AML	Acanthiomeatal line
AP	Anterior-posterior
Body fix	Vacuum immobilization cushion for the whole body
Dors. Dec.	Dorsal decubitus
EAM	External auditory meatus
LAO	Left anterior oblique
LAPO	Left anterior-posterior oblique
LIQ	Lower inner quadrant
LL Dec.	Left lateral decubitus
LLL	Left lower lobe
LOQ	Lower outer quadrant
LPAO	Left posterior-anterior oblique
LPO	Left posterior oblique
LUL	Left upper lobe
MSP	Mid sagittal plan
PA	Posterior-anterior
PDSP	Principles for the safe movement of patients
RAO	Right anterior oblique
RAPO	Right anterior-posterior oblique
RL Dec.	Right lateral decubitus
RLL	Right lower lobe
RPAO	Right posterior-anterior oblique
RPO	Right posterior oblique
RUL	Right upper lobe
UIQ	Upper inner quadrant
UOQ	Upper outer quadrant

POSITIONING

Vack-lok	Vacuum immobilization cushion
WB	Whole body

PATHOLOGIES AND CLINICAL INFORMATION

AAA	Abdominal aortic aneurysm
ARDS	Acute respiratory distress syndrome
ATB	Antibiotic
BEV	Beam's eye view
bid	Twice daily
BP	Blood pressure
BPH	Benign prostatic hyperplasia
bpm	Beats per minute
Bx	Biopsy
CBC	Complete blood count
C. Diff	Clostridium difficile
CEA	Carcinoembryonic antigen
CIS	Carcinoma in-situ
CLL	Chronic lymphocytic leukemia
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
CPR	Cardiopulmonary resuscitation
CSF	Cerebrospinal fluid
CVA	Cerebrovascular accident, stroke
die	Once a day
DLMP	Date of last menstrual period
Dx	Diagnostic
ECOG	Eastern Cooperative Oncology Group
ER	Estrogen receptor
eGFR	Glomerular filtration rate
eRPF	Effective renal plasma flow
ENT	Ear, nose and throat

PATHOLOGIES AND CLINICAL INFORMATION

Fx	Fraction
GBM	Glioblastoma multiforme
GFR	Glomerular filtration rate
HBP	High blood pressure
HER 2	Human epidermal growth factor receptor 2
HIV	Human immunodeficiency virus
HPV	Human papillomavirus
HR	Heart rate
Hx	History, background
ICP	Intracranial pressure
IMC	Internal mammary chain
IV	Intravenous
KPS	Karnofsky performance scale
LIF	Left iliac fossa
MCAS	Mast cell activation syndrome
MRSA	Methicillin-resistant Staphylococcus aureus
NG	Nasogastric
P	Pain
PAP test	Papanicolaou test / cervico-vaginal smear
PE	Pulmonary embolism
Peri-op	During the operation
PO	Orally / by mouth
Post-op	After the operation
Pre-op	Before the operation
PR	Progesterone receptor
prn	As needed
PSA	Prostate specific antigen

PATHOLOGIES AND CLINICAL INFORMATION

QA	Quality assurance
RIF	Right iliac fossa
R/O	Rule-out
RR	Respiratory rate
RSP	Retrosternal pain
SAH	Subarachnoid hemorrhage
SARS	Severe acute respiratory syndrome
SDH	Subdural hematoma
S/P	Status post
SpO_2	Blood oxygen saturation
STAT	Immediately
SVCS	Superior vena cava syndrome
Sx	Surgery
TAH + BSO	Total abdominal hysterectomy with bilateral salpingo-oophorectomy
TB	Tuberculosis
TIA	Transient ischemic attack
TNM	T (primary tumour); N (lymph nodes); M (metastasis)
Tx	Treatment
VS	Vital signs
VRE	Vancomycin-Resistant Enterococcus

PRODUCT AND MEDICATION CATEGORIES

Antagonists/Antidotes
Anesthetics
Antiemetics
Antidiabetics
Antidiarrheals
Current chemotherapy drugs
Hormone therapy drugs
Immunotherapy drugs
Corticosteroids - anti inflammatory
Diuretics
Fluids and electrolytes
Narcotics/Analgesics/Tranquilizers/Anxiolytics/Sedatives
Contrast media or contrast agents
Radiosensitizer

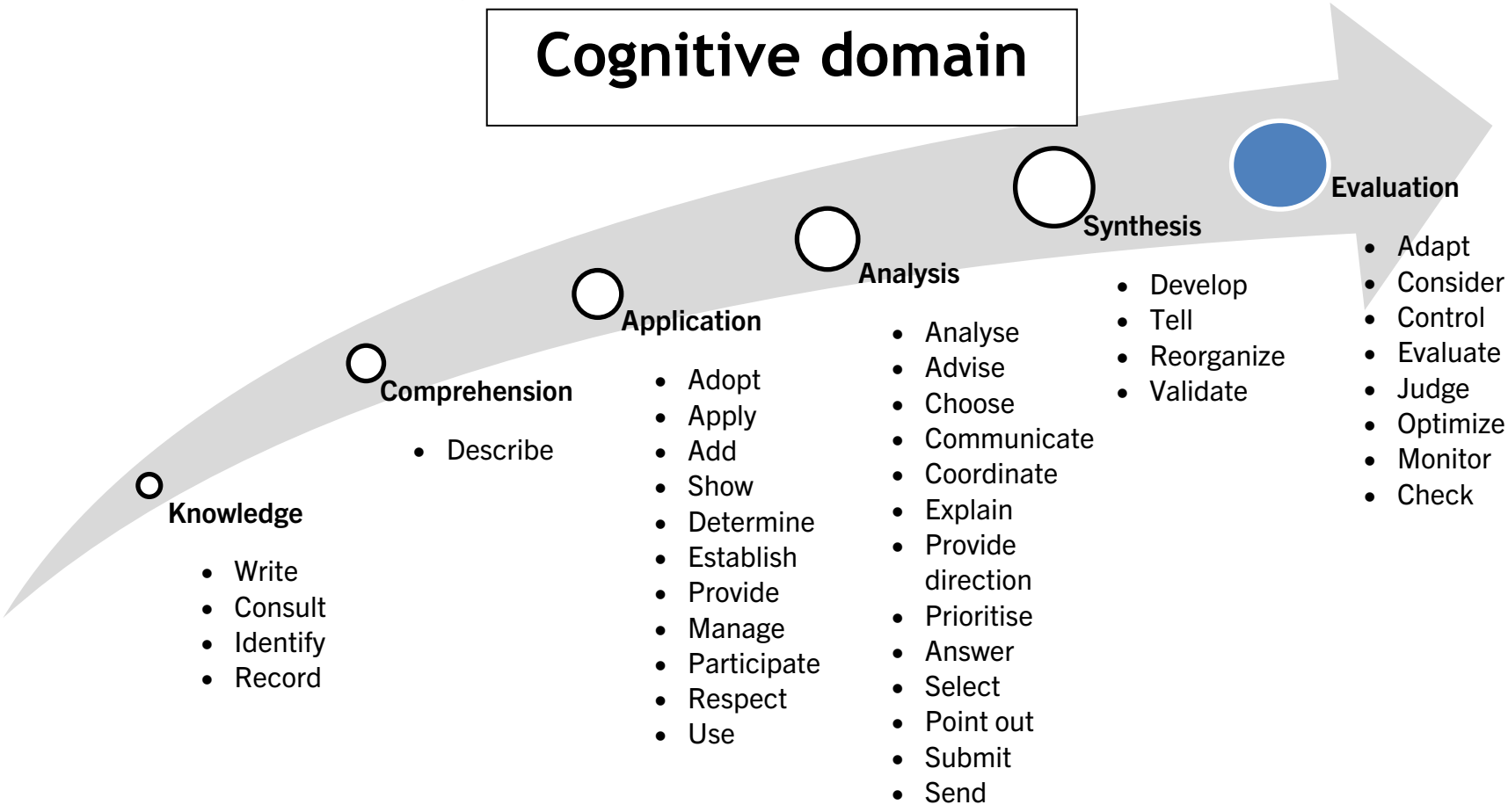
A FEW DEFINITIONS

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).
Aptitude and attitudes	A technologist who demonstrates a good professional attitude acts according to his or her aptitudes in order to achieve all of the elements necessary for competence (OTIMROEPMQ, 2010).
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».
Entry-level competency	Skills required for a technologist entering the profession on day 1.
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)
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)
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)
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).
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)

A FEW DEFINITIONS

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 2 : Taxonomy



AFFECTIVE DOMAIN

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

PSYCHOMOTOR DOMAIN

Competencies
Act / React / Take action
Administer
Arrange
Assist
Dispense care
Dispose of objects, waste...
Execute / Carry out / Perform
Intervene
Position
Practice
Prepare work sites, material...
Prevent infections from spreading
Proceed
Produce
Take
Transfer patients, objects...
Treat

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