

Professional capabilities
for medical radiation practice



Medical Radiation Practice
Board of
Australia

Contents

The domains	1
Domain 1: Professional and ethical conduct	3
Domain 2: Communication and collaboration	5
Domain 3: Evidence-based practice and professional learning	6
Domain 4: Radiation safety and risk management	7
Domain 5: Practice in medical radiation science	9
Domain 5a: Practice in diagnostic radiography	12
Domain 5b: Practice in nuclear medicine	14
Domain 5c: Practice in radiation therapy	16

Introduction

The Medical Radiation Practice Board of Australia (National Board) has developed these entry-level professional capabilities for the three divisions of medical radiation practice.

These capabilities identify the knowledge, skills and professional attributes needed to safely practise diagnostic radiography, nuclear medicine technology and radiation therapy.

The *Professional capabilities for medical radiation practice* apply to entry-level medical radiation practice professionals seeking to qualify for registration, including:

- practitioners qualified in Australia (in both four-year programs and three-year programs plus supervised practice)
- practitioners who qualified overseas
- practitioners requiring remediation, and
- practitioners who were previously registered and are returning to practice.

The National Board has powers under the National Law¹ to develop standards, codes and guidelines about the eligibility of individuals for registration in the medical radiation practice professions.

Some of the National Board's registration standards, codes and guidelines will refer to these capabilities, as will the Board's accreditation standards that will be used to assess courses that qualify graduates to register in the profession as well as the education providers that offer those courses.

Background

The National Board has decided that, in order for an individual to be granted general registration, a practitioner must be able to demonstrate professional skills, attributes and the application of knowledge in the clinical setting.

Approach to developing these capabilities

The core domains and capabilities in this document have been informed by a comparative review of the documents that describe the standards and attributes for the health professions regulated in Australia under the National Law, with substantial additions and amendments.

In this document, the description of knowledge, skills and professional attributes necessary for competent practice in the profession is approached through *capabilities* rather than *competencies*, using the following definitions (adapted from Fraser and Greenhalgh, 2001):

- *capability* is the extent to which an individual can apply, adapt and synthesise new knowledge from experience and so continue to improve their performance, and
- *competence* is what individuals know or are able to do in terms of knowledge, skills and attitudes.

How to use the capability statements

The capability statements identify the minimum knowledge, skills and professional attributes necessary for practice.

They have been grouped into domains which identify elements of practice. Domains are not an indication of procedures undertaken by MRP professionals and are not a list of tasks.

During any one procedure or treatment, it is expected practitioners will demonstrate elements from a number of domains. This recognises that competent professional practice is more than a sum of each discrete part. It requires an ability to draw on and integrate the breadth of capabilities to support overall performance.

To demonstrate capability, the candidate must apply their knowledge holistically in a clinical environment. More information about assessment will be provided in a separate document, as part of the suite of tools to support professional learning and development.

The domains

The domains for the professional capabilities for medical radiation practice are:

- Domain 1: professional and ethical conduct
- Domain 2: professional communication and collaboration
- Domain 3: evidence-based practice and professional learning
- Domain 4: radiation safety and risk management, and
- Domain 5: practice in medical radiation science:
 - 5a: practice in diagnostic radiography
 - 5b: practice in nuclear medicine, and
 - 5c: practice in radiation therapy.

Scope of each domain

Each domain identifies the scope of capabilities through a list of statements, which a registered medical radiation practitioner must demonstrate when entering the profession or re-entering the profession after a break.

¹ Section 38 of the Health Practitioner Regulation National Law, as in force in each state and territory.

Statements include levels of demonstration requirements:

- **demonstrate knowledge:** Used for areas where a broad knowledge is required, for example a practitioner needs to know the concepts contained in health and safety legislation and how to find it, but does not need to show a detailed understanding or capacity to interpret.
- **demonstrate understanding:** Used for specific areas of medical radiation practice where a practitioner needs to understand the underpinning knowledge, for example, radiographic anatomy or radiographic appearances which could be demonstrated through verbal or written testing and can be applied to inform procedures or treatments. It has also been used for modalities such as angiography, magnetic resonance imaging, ultrasound where practitioners require knowledge but may not be required to undertake the procedures.
- **apply knowledge:** Used for specific areas of medical radiation where a practitioner needs detailed knowledge that can be applied. These are the 'doing' elements.

Notes have been included at the end of some statements to clarify when some or all contemporary practices/ treatments/anatomy etc. are required. These are interpreted as follows.

- If a note states the practice/treatment/anatomy etc. must include a list of requirements, those listed are required, but not others in the same category.
- If a note states the practice/treatment/anatomy etc. may include certain requirements, then any of those listed can be included, but it is not mandatory.
- All contemporary practices/treatments/anatomy etc. are required where there is no note.

Level of capability when entering or re-entering the profession in Australia

Further information is provided against each capability statement on how that capability can be demonstrated, such as through knowledge, skills and professional attributes. These descriptions set out the minimum professional capabilities for entry or re-entry to medical radiation practice.

The professional capabilities apply to everyone, including people who:

- qualified in Australia (via a four-year program, or via a three- year program plus supervised practice)
- qualified overseas, and
- are returning to practice after taking a break (even if they were registered before they took that break).

A practitioner's capability will expand and improve as they gain professional experience. Professional capability is a reflection of how a practitioner applies their professional judgement, decision-making skills and experiential knowledge to apply their scientific knowledge, practical skills and ability in any given situation.

References

Fraser, S and Greenhalgh, T (2001) 'Coping with complexity: educating for capability', *British Medical Journal*, 323 (7316), 799-803.

Domain 1: Professional and ethical conduct

This domain covers practitioners' responsibility to be professional and ethical, and to practise within the current medico-legal framework. It also addresses their responsibility for ensuring that patient/client confidentiality and privacy is maintained at all times, while recognising the potential role as a patient/client advocate.

What registered practitioners must be able to do	Evidence of this capability for entry or re-entry to the profession
<p>1. Practise in an ethical and professional manner, consistent with relevant legislation and regulatory requirements</p>	<ul style="list-style-type: none"> a. Demonstrate understanding of legal responsibilities b. Manage personal, mental and physical health to ensure fitness to practice c. Follow mandatory and voluntary reporting obligations d. Apply the Medical Radiation Practice Board of Australia's <i>Code of conduct</i> to their practice e. Provide relevant information to patient/client and demonstrate appropriate methods to obtain informed consent f. Demonstrate knowledge of the Australian healthcare system g. Demonstrate understanding of the basic principles underpinning bio-ethics within medical radiation science practice h. Exercise appropriate levels of autonomy and professional judgement in a variety of medical radiation practice settings <p>Legal responsibilities may include an understanding of responsibilities contained in relevant state/territory and federal legislation and regulations, specific responsibilities to maintain confidentiality, confirm informed consent and exercising duty of care.</p> <p>Principles underpinning bio-ethics must include respect the rights of the individual, respect the autonomy of the individual, cause no harm, and advance the common good.</p> <p>Relevant patient/client information may include identifying people at risk such as children, pregnant women and their foetus, breastfeeding mothers; and includes information such as explaining the implications of contrast/radiopharmaceutical administration.</p> <p>Relevant aspects of the Australian healthcare system may include knowledge of service provision arrangements, the structure and role of Medicare and related billing arrangements.</p> <p>Key elements of fitness to practise must include competence, professionalism, including a sense of responsibility and accountability, self-awareness and professional values, sound mental health and the capacity to maintain health and wellbeing for practice.</p> <p>Reporting obligations must include making a notification about the health (impairment), conduct or performance of a registered health practitioner that may be placing the public at risk; as well as of their own impairments to practice.</p>

What registered practitioners must be able to do	Evidence of this capability for entry or re-entry to the profession
<p>2. Provide each patient/client with an appropriate level of dignity and care</p>	<p>a. Demonstrate understanding of the influence of socio-cultural factors on patient/client attitudes and responses to medical radiation services</p> <p>b. Display appropriate professional behaviour in patient/client interactions</p> <p>c. Identify and respect appropriate boundaries between patients/clients and health professionals</p> <p>Socio-cultural factors may include those related to cultural and linguistic diversity, age, gender, disability, socio-economic, geographic locations; and identifying as Aboriginal and/or Torres Strait Islander.</p> <p>Appropriate behaviour must include behaviour that is non-discriminatory, empathetic and respecting socio-cultural differences.</p>
<p>3. Assume responsibility, and accept accountability, for professional decisions</p>	<p>a. Recognise and respond appropriately to unsafe or unprofessional practice within their division of registration</p> <p>b. Integrate organisational policies and guidelines with professional standards within their division of registration</p> <p>c. Apply relevant quality frameworks appropriate to their division of registration</p> <p>Quality frameworks may include workplace specific frameworks, relevant jurisdiction publications and the Australian Safety and Quality Framework for Health Care published by the Australian Commission on Safety and Quality in Health Care.</p>
<p>4. Advocate on behalf of the patient/client, when appropriate within the context of the practitioner's particular division of registration</p>	<p>a. Demonstrate understanding of the principles of patient/client advocacy and their application to the medical radiation practice</p> <p>b. Recognise when it may be appropriate to intervene on the patient's/client's behalf</p> <p>c. Advise other members of the healthcare team about the suitability and application of the proposed medical radiation procedure, when appropriate</p> <p>Principles of advocacy may include supporting and promoting the rights and interests of individuals, assisting individuals to achieve or maintain their rights and representing their needs. Advocacy strategies include: representing the consumer, supporting the consumer to represent their own interests and ensuring people are empowered to voice their perspectives.²</p> <p>Advising on the suitability and application of procedures requires an understanding of the relative radiation risks and benefits to patients of the modalities/treatments used within the medical radiation practitioner's specific division of registration.</p>

2 From: www.health.qld.gov.au/hcq/publications/hcq_framework_may11.pdf

Domain 2: Communication and collaboration

This domain covers medical radiation practitioners' responsibility in utilising appropriate, clear and effective communication. It also addresses their responsibility for ensuring that they function effectively with other health practitioners at all times.

What registered practitioners must be able to do	Evidence of this capability for entry or re-entry to the profession
<p>1. Communicate clearly, sensitively and effectively with patient/client and their family or carers</p>	<ul style="list-style-type: none"> a. Establish rapport with patient/client to gain understanding of their issues and perspectives b. Communicate with the patient/client and/or carers to collect and convey information and reach agreement about the purpose of the examination/treatment, techniques and procedures c. Convey knowledge and procedural information in ways that engender trust and confidence and respects patient/client confidentiality, privacy and dignity d. Respond to patient/client queries or issues e. Identify likely communication barriers specific to individual patients/clients and/or carers f. Make appropriate adjustments to communication style to suit the particular needs of the patient/client including those from culturally and linguistically diverse backgrounds and Aboriginal and Torres Strait Islander people g. Make provisions to engage third parties to facilitate effective communication when required <p>Capacity to understand may be influenced by English language skills, health literacy, age, health status, culture.</p> <p>Communication barriers may include the medical radiation practitioner demonstrating an awareness of the ways that their own culture and experience affect their interpersonal style, and having an awareness of strategies to ensure this does not present an impediment.</p> <p>Communication beyond patient/client may include with family, significant others, carers, interpreters, legal guardians and medical advocates.</p> <p>Communication techniques must include active listening, use of appropriate language and detail, use of appropriate verbal and non-verbal cues and language, and confirming that the other person has understood.</p>
<p>2. Collaborate with other health practitioners</p>	<ul style="list-style-type: none"> a. Establish and maintain effective and respectful working relationships with health practitioners b. Demonstrate understanding of professional roles and responsibilities of healthcare team members and other service providers c. Follow accepted protocols and procedures to provide relevant and timely verbal and written communication <p>Healthcare team members may include registered health practitioners, accredited health professionals, and licensed and unlicensed healthcare workers.</p> <p>Communication methods must consider the information needs of the audience and may include the medical radiation practitioner using the medical terminology appropriate to their division of registration and applying knowledge of departmental/practice protocols.</p>

Domain 3: Evidence-based practice and professional learning

This domain covers medical radiation practitioners' responsibility to engage in evidence-based practice and to critically monitor their actions through a range of reflective processes. It also addresses their responsibility for identifying, planning and implementing their ongoing professional learning needs.

What registered practitioners must be able to do	Evidence of this capability for entry or re-entry to the profession
<p>1. Apply critical and reflective thinking to resolve clinical challenges</p>	<ul style="list-style-type: none"> a. Describe the clinical challenge or question b. Identify information required to respond to the challenge or question c. Select appropriate methods to collect and assess evidence d. Identify, access or collect information from credible sources e. Assess adequacy of information to answer the issue under inquiry f. Interpret findings, applying clinical reasoning and reflective processes to identify implications for practice g. Review clinical action plans/protocols to take account of findings <p>Selection of appropriate methods requires an understanding of commonly used quantitative and qualitative research methods.</p> <p>Critical thinking may include skills in questioning, analysing, synthesising, interpreting, and cognitive reasoning; and the critical appraisal of literature and evidence.</p> <p>Reflective practice may include self-reflection during and after a clinical challenge or experience. It may involve structured and informal reflection to review and integrate knowledge and findings into practice.</p> <p>Clinical action plans may include detailed plans or proposals, informal updates and journal articles.</p>
<p>2. Identify ongoing professional learning needs and opportunities</p>	<ul style="list-style-type: none"> a. Demonstrate understanding of legal and professional responsibilities to undertake continuing professional development (CPD) b. Critically reflect on personal strengths and limitations to identify learning required to improve and adapt professional practice c. Seek input from others to confirm learning needs of self and others to deliver improved client outcomes d. Plan and implement steps to address professional development needs <p>Professional development may be provided by the professional community and the broader healthcare network/practice.</p>

Domain 4: Radiation safety and risk management

This domain covers medical radiation practitioners' responsibility to protect patients/clients, others and the environment from harm by managing and responding to the risks inherent in both healthcare and medical radiation practice. It also addresses their responsibility for ensuring high quality professional services are provided for the benefit of patients/clients and other service users.

What registered practitioners must be able to do	Evidence of this capability for entry or re-entry to the profession
<p>1. Implement safe radiation practice appropriate to their division of registration</p>	<p>a. Demonstrate understanding of state and federal radiation safety legislation, radiation safety guidelines and international best practice for radiation management</p> <p>b. Apply principles of risk management relevant to radiation</p> <p>c. Identify radiation risks and related risk control systems and procedures</p> <p>d. Identify and apply safe radiation practice</p> <p>Safe radiation practice requires the practitioner to review the referral and procedures to ensure appropriate justification, optimisation and protection.</p> <p>Risk control must include an understanding of principles of relevant quality assurance frameworks and application to risk management.</p>
<p>2. Protect and enhance patient/client safety</p>	<p>a. Follow patient/client identification procedures to confirm the correct match of patient with intended procedure</p> <p>b. Review, communicate, record and manage client/patient information accurately, consistent with protocols, procedures and legislative requirements for maintaining patient/client records</p> <p>c. Identify and manage risks associated with patient/client transfers</p> <p>d. Identify and manage risk of infection, including during aseptic procedures</p> <p>Patient/client identification procedures must use at least three recognised patient/client identifiers, and may include procedures for transferring clients/patients from other health professionals. Procedures may be contained in workplace materials, relevant jurisdictions' materials and the Australian Commission on Safety and Quality in Health Care publications.</p> <p>Patient/client information management must comply with confidentiality and privacy. The practitioner must demonstrate awareness of the legislative requirements about ownership, storage, retention and destruction of patient/client records and other practice documentation.</p> <p>Infection control risk management must demonstrate understanding of transmission modes of hospital-acquired infections (host, agent and environment); established practices for preventing the transmission including effective hand hygiene; and ability to implement NHMRC infection prevention and control guidelines.³</p>

³ Australian guidelines for the prevention and control of infection in healthcare (2010)

What registered practitioners must be able to do	Evidence of this capability for entry or re-entry to the profession
<p>3. Confirm and operate equipment and instrumentation safely and appropriate to their division of registration</p>	<ul style="list-style-type: none"> a. Apply knowledge of equipment and instrumentation to confirm that it is in good order and operating within acceptable operating parameters b. Identify and take action to correct unacceptable condition or operation of equipment and instrumentation c. Follow protocols to record and report non-conformance of equipment <p>Good order must include application of knowledge of instrumentation, cleaning and hygiene protocols, calibration/testing regimes and acceptable operating standards.</p>
<p>4. Maintain safety of self and others in the work environment appropriate to their division of registration</p>	<ul style="list-style-type: none"> a. Demonstrate knowledge of legal responsibilities for health and safety of self and others b. Identify safety hazards in the workplace and apply knowledge of responsibilities for notification c. Identify, confirm and implement methods of radiation management d. Apply knowledge of interactions with matter, early and late effects and stochastic and deterministic effects of radiation exposure e. Identify occupancy risks related to proximity of radiation and radioactive storage f. Provide information on radiation-related hazards and control measures to others in the workplace g. Use appropriate personal protective clothing and equipment <p>Control measures must include time, distance and patient shielding.</p> <p>Responsibilities for notification of safety hazards may include protocols or instructions, legislation and regulations.</p>
<p>5. Safely manage radiation and radioactivity in the environment</p>	<ul style="list-style-type: none"> a. Apply knowledge of the environmental risks of manufactured radiation and radioactivity b. Identify safe and legal methods of handling, storage and disposal including understanding of shielding requirements c. Implement protocols and procedures in response to radiation and radioactivity incidents d. Report incidents in accordance with protocols, procedures and legal requirements <p>Incident reporting requirements may be identified in workplace materials, relevant state/territory and federal legislation and regulations, including those published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).</p>

Domain 5: Practice in medical radiation science

This domain covers the knowledge, skills and capabilities a medical radiation practitioner requires to practise independently. Elements in this domain are common to all medical radiation practitioners, taking into account the different requirements of each division of registration.

What registered practitioners must be able to do within the context of their division of registration	Evidence of this capability for entry or re-entry to the profession
<p>1. Apply their understanding of anatomy, physiology and pathology appropriate to their division of registration</p>	<p>a. Demonstrate understanding of the radiographic anatomy and physiology of the human body</p> <p>b. Demonstrate understanding of the scientific explanations underpinning disease and injuries affecting the human body</p> <p>c. Identify anatomical structures, injuries and diseases of the human body in planar and sectional images</p>
<p>2. Apply principles of medical radiation physics and instrumentation</p>	<p>a. Demonstrate understanding of principles of medical radiation physics and instrumentation</p> <p>b. Demonstrate knowledge of the instrumentation of modalities as used in each division of registration</p> <p>c. Apply principles of medical radiation physics to demonstrate how changes in physical parameters impact on patient clinical outcomes</p> <p>d. Demonstrate use of instrumentation and laboratory procedures appropriate to the division of registration</p> <p>Instrumentation may include x-ray equipment, computed radiography, digital radiography, mammography, dental panoramic radiograph, fluoroscopy, angiography, computed tomography, magnetic resonance imaging, ultrasound, positron emission tomography, single photon emission computed tomography, dose calibrator, bone mineral densitometry, well counter, centrifuges, fume hoods, superficial x-ray, linear accelerator, simulators, brachytherapy, ion chambers, planning systems.</p> <p>Laboratory procedures may include the use of sample counters such as well counters, operating centrifuges, use of fume hoods.</p>
<p>3. Use patient information management systems appropriately</p>	<p>a. Demonstrate knowledge of legislative responsibilities relating to ownership, storage, retention and destruction of client/patient records and other practice documentation</p> <p>b. Demonstrate knowledge of patient information management systems</p> <p>c. Ensure correct verification and management of information applicable to the division of registration.</p> <p>Patient information systems may include Picture and Archiving Communication System, radiation oncology information systems, Radiology Information System, electronic medical records, risk management systems.</p>

What registered practitioners must be able to do within the context of their division of registration	Evidence of this capability for entry or re-entry to the profession
<p>4. Confirm the procedure according to clinical indicators</p>	<ul style="list-style-type: none"> a. Review the patient/client's clinical history, referral and current medical information to confirm the requested procedure is appropriate b. Determine the appropriate imaging and/or treatment protocols and priorities, which considers the information collected during the initial interaction with the patient/client and knowledge of imaging and/or treatment options c. Adapt the requested examination to an individual patient/client considering available clinical information <p>Clinical history may include patient/client records, previous medical imaging/treatment, information collected from patient/client during the procedure.</p>
<p>5. Assess the patient/client's capacity to receive care</p>	<ul style="list-style-type: none"> a. Identify factors or conditions that may affect the patient/client's behaviour and/or capacity to undergo the procedure b. Demonstrate understanding of patient/client preparation requirements c. Identify patients/clients most at risk; including pregnant women and the foetus; breastfeeding mothers and their children d. Identify contraindications and limitations of medical radiation services; determine appropriate adjustments to procedures; and communicate these to the patient/client e. Perform patient/client assessment and medical radiation interventions in accordance with legislation, registration standards, codes and guidelines, including gaining informed consent <p>Patient/client's capacity or behaviour may include pre-existing medical and/or physical and physiological conditions, age, pregnancy, psycho-social, socio-economic, culture, English language skills.</p> <p>Informed consent is a person's voluntary decision about healthcare that is made with knowledge and understanding of the benefits and risks involved. A guide to the information that practitioners need to give to patients is available in the National Health and Medical Research Council (NHMRC) publication <i>General guidelines for medical practitioners in providing information to patients</i> (www.nhmrc.gov.au/).</p>
<p>6. Deliver patient/client care appropriate to their division of registration</p>	<ul style="list-style-type: none"> a. Apply knowledge of radiation biology and radiation dose adjustment to deliver safe and effective client/patient outcomes b. Identify and respond to a patient/client's deteriorating condition, or inability to undergo a procedure or treatment, consistent with duty of care and statutory requirements c. Apply knowledge of responsibilities for conveying information when significant findings are identified <p>Responsibilities for conveying information may include protocols or instructions about verbal or written communication and record keeping.</p> <p>Identifying significant findings includes recognising and applying knowledge of normal from abnormal imaging appearances and relating appearances to the patient/client's clinical history.</p>

What registered practitioners must be able to do within the context of their division of registration	Evidence of this capability for entry or re-entry to the profession
7. Manage and manipulate 3D datasets for diagnostic image production	<ul style="list-style-type: none"> a. Demonstrate understanding of how 3D datasets are generated b. Apply knowledge of the use of 3D images for optimal diagnostic or therapy outcomes to confirm that appropriate data is obtained
8. Apply knowledge of pharmaceuticals relevant to their division of registration	<ul style="list-style-type: none"> a. Demonstrate understanding of the principles and applications of pharmaceuticals b. Demonstrate understanding of the risks, precautions and contraindications of pharmaceutical use c. Apply knowledge of pharmacokinetics, pharmacodynamics and the potential range of reactions to drugs or agents relevant to their division of registration d. Follow procedures to ensure delivery of correct pharmaceuticals to patients/clients <p>Knowledge of pharmaceuticals may include relevant state and territory legislation regarding pharmaceutical administration.</p> <p>Procedures for delivery of correct pharmaceuticals may include double checking products, confirming correct labelling, accurate calculations and measurements, and correct route.</p>

Domain 5a: Practice in diagnostic radiography

This domain covers the additional knowledge, skills and capabilities a diagnostic radiographer requires to practise independently.

What diagnostic radiography practitioners must be able to do, in addition to the capabilities required under domain 5	Evidence of this capability for entry or re-entry to the profession
1. Implement and evaluate general radiography examinations for a range of patient/client presentations and complexities	a. Apply knowledge of standard radiographic projections and exposure factors for each body area and, when appropriate, modify them to take into account patient/client presentation, clinical indications and mechanisms of injury b. Apply knowledge of human anatomy to position patients/clients c. Evaluate radiographic images using radiographic criteria
2. Implement fluoroscopy in a range of settings	a. Demonstrate understanding of digital image processing, including fixed and mobile digital fluoroscopy systems b. Apply knowledge of patient/client preparation, care and aftercare, and delivery systems for contrast examinations c. Evaluate images and apply radiographic criteria to these images Mobile systems must include knowledge of the operating theatre context and associated radiation safety issues.
3. Implement diagnostic computed tomography (CT) imaging	a. Demonstrate understanding of the use, design and operation of CT systems b. Demonstrate understanding of imaging parameters and scan protocols based on the range of patient presentations c. Perform and evaluate unenhanced and contrast CT examinations of the body and, when appropriate, modify them to take into account patient/client presentation and clinical indications d. Apply knowledge of post-processing techniques, including multi-planar reformats and volume imaging CT systems must include contrast timing in CT acquisition, including contrast delivery systems and a capacity to estimate relative dose levels associated with a variety of CT scans.
4. Explain the principles and clinical applications of angiography and interventional techniques	a. Demonstrate understanding of the use, design and operation of angiography systems b. Demonstrate understanding of angiographic anatomy c. Demonstrate understanding of angiographic image acquisition, image registration and post-processing options d. Demonstrate understanding of patient/client preparation and post-procedure care requirements of contrast delivery systems Angiography systems must include contrast and other delivery systems, aseptic techniques, diagnostic catheters, interventional devices.

What diagnostic radiography practitioners must be able to do, in addition to the capabilities required under domain 5	Evidence of this capability for entry or re-entry to the profession
<p>5. Explain the principles and clinical applications of magnetic resonance (MR) imaging</p>	<p>a. Demonstrate understanding of MR image production, including the hazards associated with MR imaging</p> <p>b. Demonstrate understanding of the clinical context for MR examinations</p> <p>c. Describe protocols applicable to MR examinations in adult patient/clients</p> <p>MR examinations may include knee, spine and brain.</p> <p>Clinical context includes the relationship to diagnostic radiography examinations using x-ray, CT and angiography.</p>
<p>6. Explain the principles and clinical applications of ultrasound imaging</p>	<p>a. Demonstrate understanding of the physics of ultrasound image production</p> <p>b. Demonstrate understanding of the clinical context for ultrasound imaging and ultrasound examinations</p> <p>Examinations may include obstetric, the abdomen and superficial (small) parts.</p> <p>Clinical context includes patient/client preparation and the relationship of ultrasound to diagnostic radiography examinations using x-ray, CT and angiography.</p>
<p>7. Explain the principles of mammographic imaging within the clinical context</p>	<p>a. Demonstrate understanding of screening and diagnostic mammography</p> <p>b. Demonstrate understanding of mammographic projections used in screening mammography</p> <p>c. Demonstrate understanding of the criteria applied to screening mammographic images</p>

Domain 5b: Practice in nuclear medicine

This domain covers the additional knowledge, skills and capabilities a nuclear medicine technologist requires to practise independently.

What nuclear medicine technology practitioners must be able to do, in addition to the capabilities required under domain 5	Evidence of this capability for entry or re-entry to the profession
1. Implement the preparation and assess purity of radiopharmaceuticals	<ul style="list-style-type: none"> a. Perform the elution and quality control of a radioisotope generator b. Assay the eluate and prepare radiopharmaceuticals ensuring critical procedure features are observed, such as correct volume c. Perform quality control on radiopharmaceuticals and assess for patient/client use
2. Explain the biodistribution and applications of radiopharmaceuticals including therapies	<ul style="list-style-type: none"> a. Demonstrate understanding of biodistribution, including determining whether it is normal, altered or unexpected
3. Implement routine nuclear medicine imaging	<ul style="list-style-type: none"> a. Demonstrate understanding of standard nuclear medicine planar projections and their application to each body area b. Demonstrate understanding of appropriate dosage of both isotope and CT for each patient/client c. Perform SPECT/CT and PET/CT studies, including positioning the patient/client for the best diagnostic outcome d. Evaluate nuclear medicine images and apply nuclear medicine quality criteria to these images <p>Studies may include bone, myocardial perfusion, gated heart pool, lung perfusion/ventilation, thyroid, and renal studies as well as oncologic cardiac and neurologic PET studies.</p>
4. Implement computed tomography (CT) imaging for nuclear medicine imaging	<ul style="list-style-type: none"> a. Demonstrate understanding of the use, design and operation of CT systems b. Demonstrate understanding of imaging parameters, scan protocols and relative dose levels based on the range of patient presentations c. Perform and evaluate anatomical/attenuation correction CT scan d. Apply knowledge of post-processing techniques, including multi-planar reformats and volume imaging

What nuclear medicine technology practitioners must be able to do, in addition to the capabilities required under domain 5	Evidence of this capability for entry or re-entry to the profession
<p>5. Implement the delivery of nuclear medicine radioisotope examinations and therapies</p>	<ul style="list-style-type: none"> a. Calculate the dose and decay of radioisotopes used in examinations and therapies b. Demonstrate understanding of the difference between therapeutic and diagnostic doses, as it affects the patient/client, health practitioner and the general public c. Demonstrate understanding of the principles underpinning nuclear medicine therapies d. Apply patient/client preparation, care and aftercare, and delivery systems for nuclear medicine radioisotope therapies e. Use appropriate dose delivery systems and safe, aseptic techniques <p>Delivery systems may include arterial, oral, IV, subcutaneous and inhalation.</p>
<p>6. Describe how to undertake in vivo and in vitro laboratory procedures</p>	<ul style="list-style-type: none"> a. Describe safe, aseptic blood-labelling procedures b. Describe in vivo laboratory procedures c. Demonstrate knowledge of methods to determine if results of laboratory procedures are normal, altered or unexpected

Domain 5c: Practice in radiation therapy

This domain covers the additional knowledge, skills and capabilities a radiation therapist requires to practise independently.

What radiation therapy practitioners must be able to do, in addition to the capabilities required under domain 5	Evidence of this capability for entry or re-entry to the profession
<p>1. Apply knowledge of stabilisation devices related to radiation therapy</p>	<ul style="list-style-type: none"> a. Determine immobilisation methods suitable for simulation, planning and treatment; and appropriate to the patient/client's condition and presentation b. Identify and explain the immobilisation required for a particular radiation therapy procedure and/or treatment technique c. Fabricate or adapt suitable immobilisation devices and ancillary equipment as required in radiation therapy d. Recognise limitations/restrictions in the use of stabilisation and immobilisation devices
<p>2. Apply treatment simulation techniques</p>	<ul style="list-style-type: none"> a. Apply knowledge of oncologic physiology to evaluate images for patient/client b. Demonstrate understanding of imaging modalities suited to individual patient presentations and related planning procedures c. Perform CT-based simulation for all major cancer sites, patient presentations and related planning procedures d. Demonstrate understanding of the use of MRI and PET in simulation imaging
<p>3. Apply knowledge of treatment planning</p>	<ul style="list-style-type: none"> a. Demonstrate understanding of radiation physics and biology related to treatment planning b. Apply knowledge of generating and evaluating treatment plans c. Produce radiotherapy treatment plans using relevant protocols <p>Treatment planning must include imaging and treatment modalities used including CT, MRI, PET and may include brachytherapy, superficial radiotherapy, radiosurgery/stereotactic radiotherapy, paediatric radiotherapy, total body radiation and proton therapy.</p> <p>Planning procedures must include identifying tumour and target volumes, and normal tissue volumes.</p> <p>Treatment plans may include 2D, 3D and 4D, conformal radiation therapy (3D CRT), intensity-modulated radiation therapy (IMRT) and may include volumetric-modulated arc therapy (VMAT).</p>

What radiation therapy practitioners must be able to do, in addition to the capabilities required under domain 5	Evidence of this capability for entry or re-entry to the profession
<p>4. Implement computed tomography (CT) imaging for oncologic treatment planning</p>	<ul style="list-style-type: none"> a. Demonstrate understanding of the design and operation of CT systems b. Demonstrate understanding of imaging parameters, scan protocols and relative dose levels based on the range of patient presentations c. Perform and evaluate CT examinations of the body and when appropriate, modify them to take into account patient/client presentation and clinical indications d. Apply knowledge of post-processing techniques, including multi-planar reformats and volume imaging
<p>5. Implement treatment techniques according to approved plans</p>	<ul style="list-style-type: none"> a. Demonstrate understanding of the safe and effective use, design and operation of radiation therapy treatment systems b. Demonstrate understanding of requirements for treatment delivery recording systems c. Implement the developed plans to demonstrate a range of treatment techniques d. Apply knowledge of verification systems and their impact on treatment delivery <p>Implementation of plans must identify and apply radical and palliative treatment doses and acceptable dose limits to critical structures.</p>