

Consultation paper

11 June 2013

Professional capabilities for medical radiation practice

Introduction

The Medical Radiation Practice Board of Australia (National Board) has developed draft entry-level professional capabilities for the three divisions of the medical radiation practice profession and is now seeking input from stakeholders.

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

The entry-level professional capabilities apply to everyone, including practitioners qualified in Australia (whether via a four year program or via a three year program plus supervised practice), practitioners qualified overseas and practitioners previously registered and returning to practice.

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

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

The National Law requires the National Board to undertake wide-ranging consultation on the content of proposed standards, codes and guidelines. At the completion of this consultation, the National Board will consider the feedback received (in the context of its legal obligations of the National Law), and publish the *Professional capabilities for medical radiation practice*.

Making a submission

The National Board invites interested parties to provide their written comments on the content of the draft capabilities addressed to medicalradiationconsultation@ahpra.gov.au by close of business on **Monday 22 July 2013**.

Submissions by post should be addressed to the Executive Officer, Medical Radiation Practice Board of Australia, AHPRA, GPO Box 9958, Melbourne, 3001.

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

How your submission will be treated

Submissions will generally be published unless you request otherwise. The National Board publishes submissions on its website to encourage discussion and inform the community and stakeholders. However, the National Board will not publish on its website, or make available to the public, submissions that contain offensive or defamatory comments or which are outside the scope of reference.

Before publication, the National Board may remove personally-identifying information from submissions, including contact details. The views expressed in the submissions are those of the individuals or organisations who submit them and their publication does not imply any acceptance of, or agreement with, these views by the National Board.

The National Board also accept submissions made in confidence. These submissions will not be published on the website or elsewhere. Submissions may be confidential because they include personal experiences or other sensitive information. Any request for access to a confidential submission will be determined in accordance with the Freedom of Information Act 1982 (Cth), which has provisions designed to protect personal information and information given in confidence.

Please let the National Board know if you do not want your submission published, or want all or part of it treated as confidential.

The interaction of this draft with the Supervised practice registration standard and guidelines and the Accreditation standard

The National Board is also currently consulting on the *Supervised practice guidelines* to complement the *Supervised practice standards* which are being developed. The National Board recommends the proposed *Supervised practice guidelines for medical radiation practice* be read in conjunction with this consultation paper.

The Medical Radiation Practice Accreditation Committee (Accreditation Committee) is responsible under the National Law for developing the *Accreditation standard* that will be used to assess those courses that qualify graduates to register in the profession and the education providers that offer them. The Accreditation Committee will consult on the *Accreditation standard* and an *Accreditation process* in the middle of the year.

The *Professional capabilities for medical radiation practice* will underpin both the *Supervised practice guidelines* and the *Medical Radiation Practice Accreditation standard*. Feedback received as part of the consultation about either of these documents may be taken into account in the National Board's consideration of possible amendments to the draft *Professional capabilities for medical radiation practice*.

Background

The National Board has decided that, in order for an individual to be granted general registration, a practitioner must be able capable of demonstrating professional skill, attributes and the application of knowledge in the clinical setting. The requirement to demonstrate capability would apply equally to graduates of programs of study, overseas trained practitioners, practitioners returning to practice and those practitioners for whom a level of remediation may be necessary.

In order to develop the domains, measures and assessment of practitioner capability the National Board established the Capabilities Working Group under the requirements of the Health Practitioner Regulation National Law, as in force in each state and territory (the National Law).² Schedule 4 of the National Law

² The legislation can be found at www.ahpra.gov.au/Legislation-and-Publications/Legislation.aspx

empowers the Board to establish committees to provide assistance or advice to the Board in the exercise of its functions.

Approach to developing the *Professional capabilities for medical radiation practice*

The core domains and capabilities in the *Professional capabilities for medical radiation practice* have been informed by a comparative review of the documents that describe the standards and attributes for the 14 health professions regulated by the National Law, with substantial additions and amendments.

The definition of knowledge, skills and professional attributes necessary for competent practice in the profession is approached through *capabilities* rather than *competencies* and adopted the following definitions of *capability* and *competence* (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
- *Competence* is what individuals know or are able to **do** in terms of knowledge, skills and attitudes

Comment [UniSA1]: The domains are written as "What the practitioner must be able to do" which seems to fit more into the definition of competency.

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: reflective practice and professional learning
- Domain 4: quality and risk management
- Domain 5: radiation safety
- Domain 6: practice in medical radiation science
- Domain 6A: practice in diagnostic radiography
- Domain 6B: practice in radiation therapy
- Domain 6C: practice in nuclear medicine

Issues for discussion

The entry-level *Professional capabilities for medical radiation practice* will apply to all 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 qualified overseas, and
- practitioners previously registered and returning to practice.

When providing feedback, stakeholders therefore need to consider whether the proposed descriptions of how the capabilities are demonstrated reflects the professions expectations for entry-level practitioners,

rather than experienced practitioners, who would generally bring a greater level of expertise to each capability.

The National Board's view is that there is a difference between what the profession demands in a particular workplace setting and what the profession expects every entry level practitioner to be able to do. The Professional capabilities in this document focus on the latter.

The National Board also consider that leadership and management are not expected of an entry level practitioner– for example, management of medical radiation systems; evaluation of medical radiation services.

Questions for consideration

The National Board invites comments and feedback from interested parties on the *Professional capabilities for medical radiation practice*.

1. Are the domains for the professional capabilities appropriate?
2. Are there additional domains necessary to identify the professional skills, attributes and the application of knowledge necessary for entry-level independent practice?
3. Are the descriptions of what a practitioner must be able to do suitable for entry-level practitioners?
4. Are the descriptions of how capability can be demonstrated suitable?
5. Do the descriptors provide sufficient capacity to be applied in a range of clinical settings?
6. Are the definitions of each domain appropriate?
7. Is it appropriate to require the same level of knowledge and skill in CT of entry-level practitioners in each division of practice?
8. Is the document clear?
9. Is the glossary correct and comprehensive?
10. What is the likely impact of this proposal on individual registrants?
11. Are there jurisdiction-specific impacts for practitioners, or governments or other stakeholders that the National Board should be aware of, if these capabilities are adopted?
12. Are there implementation issues the National Board should be aware of?

Attachments

The draft *Professional capabilities for medical radiation practice* are at [Attachment A](#).

References

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

Draft *Professional capabilities for medical radiation practice*

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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: reflective practice and professional learning
- Domain 4: quality and risk management
- Domain 5: radiation safety, and
- Domain 6: practice in medical radiation science:
 - 6a practice in diagnostic radiotherapy
 - 6b practice in radiation therapy, and
 - 6c practice in nuclear medicine.

Scope of each domain

Each domain identifies the scope of capabilities, through a list of statements, which a registered medical radiation practitioner must demonstrate on entry to the profession.

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 qualified in Australia (whether via a four year program or via a three year program plus supervised practice), people qualified overseas and people who 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.



Domain 1: Professional and ethical conduct

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

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry or re-entry to the profession
1. Practise in a professional manner that is characterised by integrity, honesty and respect	a. Working knowledge of their legal responsibilities, particularly in respect to confidentiality, informed consent and duty of care. b. Identifying basic principles underpinning bio-ethics within medical radiation science practice: i. respect the rights of the individual ii. respect the autonomy of the individual iii. cause no harm, and iv. advance the common good. c. Practising in a way that engenders trust and confidence in the patient/client. d. Exercising appropriate levels of autonomy and professional judgement in a variety of medical radiation practice settings.
2. Apply the Medical Radiation Practice Board of Australia's <i>Code of conduct</i> to their practice	a. Applying the <i>Code of conduct</i> to their practice, including in relation to: i. providing good care, including shared decision making ii. working with patients or clients iii. working with other practitioners iv. working within the health care system v. minimising risk vi. maintaining professional performance

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry or re-entry to the profession
	<ul style="list-style-type: none"> vii. professional behaviour and ethical conduct viii. maintaining health and well being for practice, and ix. teaching, supervising and assessing.
3. Manage their own mental and physical health, and responsibly determine their own ongoing fitness to practise	<ul style="list-style-type: none"> a. Knowing the key elements of fitness to practise. b. Understanding the need to maintain an appropriate work/life balance to promote sound mental and physical health. c. Knowing when, under the National Law, a notification must be made for health reasons, including drug and alcohol abuse.
4. Explain the legal responsibilities as a medical radiation practitioner	<ul style="list-style-type: none"> a. Understanding what constitutes notifiable conduct for a registered health practitioner under the National Law. b. Understanding their mandatory reporting obligations under the National Law to notify AHPRA about the conduct, health or performance of another health practitioner that may be placing the public at risk, as well as of their own impairments to practice. c. Understanding other relevant legal issues and obligations.
5. Provide each patient/client with an appropriate level of dignity and care which is culturally respectful, empathetic and non-discriminatory	<ul style="list-style-type: none"> a. Understanding the influence of culture on patient/client attitudes and responses to medical radiation services. b. Having working knowledge of how the geographic, cultural, and socio-economic characteristics of the local community may impact on the health of individuals and their general access to health services, and medical radiation practice more specifically. c. Displaying appropriate professional behaviour in patient/client interactions, including empathy.
6. Assume responsibility and accept accountability for their own professional decisions	<ul style="list-style-type: none"> a. Recognising, and responding appropriately, to unsafe or unprofessional practice within their division of registration. b. Integrating organisational policies and guidelines with professional standards within their division of registration. c. Acknowledging the differences in accountability and responsibility between registered health practitioners, and licensed and unlicensed health care workers.
7. Advocate on behalf of the patient/client, when appropriate	a. Knowing the principles of patient/client advocacy and their application to the medical radiation

Comment [UniSA2]: This capability requires more clarification. Unsure as to what the licensed and unlicensed health care workers would be in medical radiation setting.

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry or re-entry to the profession
within the context of the practitioner's particular division of registration	practice. b. Recognising when it may be appropriate for them to intervene on the patient's/clients behalf.

Domain 2: Professional 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	Ways that this capability will be demonstrated at entry or re-entry to the profession
<p>1. Communicate clearly, sensitively and effectively with patient/clients and their family</p>	<p>a. Explaining techniques and procedures to the patient/client/interpreter in plain English, avoiding the use of professional jargon, whenever possible, to enable patients/clients and their family (when appropriate) to make informed decisions.</p> <p>b. Adapting explanatory statements to take into account patients'/clients' English competency, age and or health status, culture or gender.</p> <p>c. Recognising the importance of active listening in promoting patient/client autonomy.</p> <p>d. Understanding the impact of non-verbal communication on a patient/client's understanding of the procedure and how this can be affected by socio-cultural factors (age, gender and religious practices).</p> <p>e. Knowing when to use an interpreter to assist with communication.</p> <p>f. Using culturally competent communication, including with Aboriginal and Torres Strait Islander people.</p>
<p>2. Communicate clearly and effectively with other health practitioners</p>	<p>a. Recognising, prior to delivering a service, when it is necessary to communicate with the referring practitioner.</p> <p>b. Using an appropriate form of communication to engage with other health practitioners, including applying knowledge of departmental/practice protocols.</p> <p>c. Using the medical terminology appropriate to their division of registration.</p> <p>d. Communicating aspects of the patient's condition to other health practitioners, when it could impact on patient/client health outcomes.</p> <p>e. Providing the referring health practitioners with an informed professional opinion about any aspect of the technique or procedure that may assist in patient/client care management.</p>
<p>3. Work collaboratively with other health care practitioners for the benefit of the patients/clients</p>	<p>a. Having a good working knowledge of the relevant areas of the Australian health care system.</p> <p>b. Understanding the role of medical radiation division of registrations within the health system.</p> <p>c. Understanding the role of other health professions.</p>

Comment [UniSA3]: ? delete from capability as the term 'plain English' is subjective. Or if it is to be included in this document, then explain this term in the glossary.

Comment [UniSA4]: This statement requires more clarification ie what are the 'relevant' areas of the Australian health care system that would fit into this capability.

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry or re-entry to the profession
<p>4. Advise, when appropriate, other members of the health care team about the suitability and application of the proposed medical radiation procedure</p>	<p>a. Understanding the relative radiation risks and benefits to patients of the modalities/treatments used within their specific division of registration.</p> <p>b. Having a working knowledge of the efficacy of either current medical imaging modalities or therapy treatment options for the diagnosis and/or treatment of common clinical conditions.</p> <p>c. Recognising when it is appropriate to provide to advice to members of the health care team on the suitability of a proposed examination, therapeutic application or interaction and when it is appropriate to refer them to a medical specialist.</p>

Comment [UniSA5]: typo

Domain 3: Reflective practice and professional learning

This Domain covers the 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 their ongoing professional learning needs and managing their mental and physical health in order to remain fit to practise.

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry and re-entry to the profession
1. Use the evidence based process to ensure that the patient/client receives the best possible diagnostic/therapeutic outcome	<ul style="list-style-type: none"> a. Understanding the key elements of critical thinking, including skills in questioning, analysing, synthesising, interpreting, and cognitive reasoning and be able to communicate these to others when required. b. Applying critical thinking to resolve clinical challenges and problems within their specific medical radiation division of registration through the formulation of informed and justifiable clinical action plans.
2. Improve and adapt professional practice by engaging in critical self-reflection, and integrating new experience and knowledge into their own practice	<ul style="list-style-type: none"> a. Distinguishing between personal reflection as a purely introspective process and the process of critical self-reflection as part of improving own practice. b. Evidence of engagement in a recognised method of critical self-reflection.
3. Critically appraise literature	<ul style="list-style-type: none"> a. Understanding qualitative and quantitative methodologies commonly used in research within the specific medical radiation division of registration. b. Understanding how to match a medical radiation practice research question with a suitable research methodology.
4. Identify their ongoing professional learning responsibilities	<ul style="list-style-type: none"> a. Engaging in learning that enhances their professional competence. b. Engaging with their professional community. c. Participating in appropriate educational and professional opportunities that may be provided by the broader health care network/practice.

Domain 4: Quality and risk management

This Domain covers the medical radiation practitioners' responsibility to protect patients/clients from harm by managing and responding to the risks inherent in both health care and medical radiation practice. It also addresses their responsibility for ensuring the quality of professional services is maintained and improved for the benefit of patients/clients and other service users.

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry and re-entry to the profession
<p>1. Protect and enhance patient/client safety</p>	<ul style="list-style-type: none"> a. Understanding the principles of quality assurance and quality improvement. b. Understanding the principles of risk management. c. Undertaking activities that support a quality assurance program. d. Recognising when equipment is no longer operating within normal parameters, reporting it and taking corrective action, if appropriate. e. Interpreting basic patient/client monitoring data. f. Recognising when a patient/client's condition is deteriorating and responding appropriately, such as by triggering an alert. g. Understanding and complying with statutory requirements, including relevant workplace health and safety legislation. h. Understanding and complying with statutory requirements relating to adverse and critical incidents and standards for practice at all times i. Having the ability to provide basic patient/client emergency care, including first aid. j. Understanding and complying with the processes for safely receiving a patient/client from other health care staff. k. Physically transferring a patient/client in a manner that is safe for both the patient/client and themselves. l. Understanding medical radiation safety considerations and safety systems.
<p>2. Adhere to best practice patient/client identification, the verification of the correct procedure and any contraindications to the medical radiation service</p>	<ul style="list-style-type: none"> a. Applying a system that ensures the correct identification of patients and correct matching of patients with their intended procedure by using at least three recognised patient/client identifiers. b. Understanding the contraindications/limitations of the medical radiation services within their division of registration

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry and re-entry to the profession
3. Respond appropriately to serious and/or unforeseen results of, or reactions to, delivery of the medical radiation service	<ul style="list-style-type: none"> a. Recognising when to alert the appropriate practitioner about serious and/or unforeseen results of, or reactions to, the delivery of the medical radiation service. b. Ensuring that the patient/client is referred to their general practitioner or hospital emergency department in cases when a serious diagnosis has been identified during an examination, treatment or procedure.
4. Apply current NHMRC infection prevention and control guidelines ³	<ul style="list-style-type: none"> a. Understanding the transmission modes of hospital-acquired infections (host, agent and environment). b. Utilising established practices for preventing the transmission of infection in health care. c. Understanding and complying with hand hygiene guidelines.
5. Uphold the patient's/client's right to quality medical radiation practice	<ul style="list-style-type: none"> a. Understanding and complying with confidentiality and privacy requirements when sharing health information. b. Being aware of the legislative requirements about ownership, storage, retention and destruction of patient/client records and other practice documentation. c. Accurately recording clinical data and patient/client information in a legible, secure and accessible form. d. Appropriately assessing documentation for compliance with legal requirements. e. Utilising the clinical information provided to adapt the requested examination to an individual patient/client or client. f. Completing documentation for compliance with legal requirements. g. Prioritising the examination according to patient's/client's medical status and the available resources.
6. Apply knowledge of pharmaceuticals relevant to their specific division of registration	<ul style="list-style-type: none"> a. Understanding the principles and applications of pharmaceuticals that are relevant to their division of registration, including risks, precautions and contraindications. b. Having knowledge of pharmacokinetics, pharmacodynamics and the potential range of reactions to drugs or agents common to their division of registration.

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

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry and re-entry to the profession
	c. Accurately performing checking processes to assure patient/client safety (such as double checking a product label, calculations and measurements).

Domain 5: Radiation safety

This domain covers the medical radiation practitioners' responsibility for the application and safe use of radiation for the benefit of patients/clients, staff and the general public.

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry and re-entry to the profession
1. Apply knowledge of radiation biology and radiation dose	<ul style="list-style-type: none"> a. Employing radiation biology knowledge by following the correct procedures for their division of registration. b. Performing procedures in accordance with the ALARA Principle. c. <u>Estimating</u> radiation doses and exposure as required within their division of registration according to ARPANSA guidelines.
2. Implement safe radiation practice for patients, staff, and the environment as a whole	<ul style="list-style-type: none"> a. Applying knowledge of clinical centre procedures, state and federal radiation safety legislation. b. Understanding of national radiation safety guidelines and international best practice for radiation management. c. Applying safe radiation practice to all procedures. d. Analysing each procedure to ensure justification, optimisation and protection. e. Understanding <u>and applying</u> dose reduction techniques within their division of registration f. Performing setup procedures correctly to ensure that the minimum radiation or prescribed dose is used.
3. Recognise when equipment is not performing correctly within the prescribed radiation limits	<ul style="list-style-type: none"> a. Being aware of the normal operating parameters b. Recognising when the equipment's operating parameters are abnormal c. Taking appropriate action when equipment is not functioning correctly
4. Store and dispose of radiation sources <u>safely</u>	<ul style="list-style-type: none"> a. Understanding of the thickness of shielding required for safe and legal storage of radioactive material. b. Calculating the decay of the material prior to disposal.

Comment [UniSA6]: consider re-wording this capability to delete the word 'estimating' as we should be working to ARPANSA guidelines at all times

Comment [UniSA7]: It was thought that the capability of storing and disposing a radiation hazard/spill better sat in domain 6B. Reporting a radiation hazard/spill, however could remain in domain 5.

What registered practitioners must be able to do	Ways that this capability will be demonstrated at entry and re-entry to the profession
	c. Understanding occupancy as it pertains to proximity of radioactive storage.
5. Know when to report and how to appropriately deal with a radiation hazard/spill	a. Applying safe decontamination and containment procedures. b. Calculating the decay of the residual material.

Domain 6: Practice in medical radiation sciences

Comment [UniSA8]: Also consider adding comparative imaging to this domain.

This domain covers the knowledge, skills and capabilities a medical radiation practitioner is required to attain to practise independently. Some elements are common to all medical radiation practitioners, taking into account the different requirements between the divisions of registration, while other capabilities are specific to their division of registration.⁴

What registered practitioners must be able to do within the context of their division of registration	Ways that this capability will be demonstrated at entry or re-entry to the profession
1. Deliver appropriate patient/client care within their division of registration	<ul style="list-style-type: none"> a. Understanding the psycho-social factors influencing the behaviour of patients/clients undergoing medical radiation procedures and/or treatment within their division of registration. b. Applying patient/client assessment skills to determine the extent that pre-existing medical and/or physical conditions might impact on the patient/client's capacity to cooperate during the procedure.
2. Interpret the request form and match the selection of procedure to the clinical indicators	<ul style="list-style-type: none"> a. Understanding the structure and function of the human body and the principles of human disease: pathology and physiological processes. b. Understanding medical terminology in the context of the patient's/client's clinical history and the procedure being requested. c. Having broad and current knowledge of radiation physics relating to their division of registration. d. Interpreting and analysing information during the initial interaction with the patient/client, including any previous imaging/treatment. e. Adapting and adopting the appropriate protocols for best diagnostic/treatment outcomes during the initial interaction with the patient/client. f. Ensuring that the selection of the imaging projections or protocol takes into account information collected during the initial interaction with the patient/client.
3. Recognise, and practise within, their own expertise and any professional or organisational limits	<ul style="list-style-type: none"> a. Seeking advice when the needs of patients/clients are beyond the abilities and education of the registrant.

⁴ This sub-domain (6) applies to all three divisions of registration: diagnostic radiography, nuclear medicine and radiation therapy. Each of the supplementary domains, 6A, 6B and 6C, include capabilities specific to each division of registration.

What registered practitioners must be able to do within the context of their division of registration	Ways that this capability will be demonstrated at entry or re-entry to the profession
	b. Performing patient/client assessment and medical radiation interventions in accordance with legislation and standards of practice regulating medical radiation practitioners.
4. Demonstrate broad and current understanding of CT as it relates to the practitioner's division of registration	a. Identifying the sectional imaging representation of the musculoskeletal, cardiovascular, respiratory, genito-urinary, gastro-intestinal, endocrine and neurological systems. b. Identifying the sectional imaging representation of common disease conditions affecting the musculoskeletal system, respiratory, cardiovascular, genito-urinary, gastro-intestinal, endocrine and neurological systems. c. Understanding the physical principles applicable to multislice CT image reconstruction and display.
5. Demonstrate broad and current understanding of information systems within medical radiation science	a. Understanding the principles underpinning the information systems applicable to the practitioner's division of registration. b. Awareness of the role patient information systems play in the management of patients.
6. Demonstrate broad and current understanding of the range of imaging modalities as they relate to their division of registration	a. Understanding the role that the radiation therapy, radiography and nuclear medicine may assume within their specific division of registration. b. Understanding the principles and applications of ultrasound imaging relevant to their specific division of registration. c. Understanding the principles and applications (including safety) of MRI relevant to their specific division of registration. d. Understanding the principles and applications of mammography and bone densitometry as required by their division of registration.
7. Demonstrate broad and current understanding of medical radiation practice within paediatric medicine	a. Having knowledge of childhood behavioural development. b. Having knowledge of congenital and acquired paediatric diseases. c. Adapting procedure techniques to achieve the best diagnostic/ therapeutic outcome for paediatric patients/clients. d. Having the capacity to implement evidence based paediatric dose reduction strategies.

Comment [UniSA9]: Adding multislice may limit this capability and so a suggestion is to remove this word and leave as CT image reconstruction.

Comment [UniSA10]: Also consider including PET in this capability

Comment [UniSA11]: Consider adding applications to this capability

Comment [UniSA12]: It was thought that there should also be some consideration of geriatric patients in this capability

Comment [UniSA13]: congenital paediatric diseases ?not applicable for Radiation Therapy

Domain 6A: Practice in diagnostic radiography

What diagnostic radiography practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry or re-entry to the profession
<p>1. Implement and evaluate projection radiography examinations for a range of patient/client presentations and complexities</p>	<p>a. Using their knowledge of surface anatomy and gross anatomy of the axial and appendicular skeleton, respiratory system and abdomen to appropriately and accurately position patients/clients for projection radiography.</p> <p>b. Having knowledge of the standard projection radiography for each body area.</p> <p>c. Having skills in modifying standard projections to take into account patient/client presentation and clinical indications.</p> <p>d. Having knowledge of modern image receptors and x-ray image production.</p> <p>e. Comprehending the physical principles underpinning computed radiography and digital radiography, the interplay of exposure factors and the conditions requiring their manipulation to achieve a diagnostic image.</p> <p>f. Having sound knowledge of projection radiography x-ray equipment.</p> <p>g. Estimating the dose levels associated with projection radiography examinations.</p> <p>h. Having sound knowledge of planar radiographic anatomy.</p> <p>i. Evaluating radiographic images and applying radiographic criteria to these images.</p> <p>j. Applying knowledge of human disease and trauma processes to the evaluation of projection radiography images.</p>
<p>2. Provide a verbal radiographic opinion about any abnormal element in a radiographic image set.</p>	<p>a. Understanding of the legal framework for providing the opinion.</p> <p>b. Having thorough knowledge of the typical radiographic appearances of common disease processes and trauma affecting the axial and appendicular skeleton, chest and abdomen.</p>
<p>3. Perform and evaluate extra-oral dental imaging.</p>	<p>a. Performing and evaluating OPG, cephalometry and cone beam CT.</p>
<p>4. Implement fluoroscopy in a range of settings (including operating theatre)</p>	<p>a. Understanding digital image processing, including digital fluoroscopy (fixed and mobile systems).</p> <p>b. Estimating the dose levels associated with a range of fluoroscopic examinations.</p> <p>c. Having knowledge of patient/client preparation, aftercare and delivery systems for contrast examinations performed using fluoroscopy.</p>

Comment [UniSA15]: Consider replacing by human body

Comment [UniSA14]: It was thought that mobiles, theatre and trauma (emergency) radiography should also be included in Domain 6A. These are important aspects of the diagnostic radiography profession.

Comment [UniSA16]: ? delete or include description of what constitutes modern in the glossary

Comment [UniSA17]: Unsure why extra-oral dental is in its own section as this would be included in 6A (1.)

Comment [UniSA18]: Suggest more clarity about this capability. How is this performed in practice?

Comment [UniSA19]: Aftercare is also an important capability in fluoroscopy and should be considered as an addition here.

What diagnostic radiography practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry or re-entry to the profession
	<ul style="list-style-type: none"> d. Understanding the complexity of the theatre context and the associated radiation safety issues. e. Being able to undertake adaptive positioning for fluoroscopy
5. Implement CT imaging	<ul style="list-style-type: none"> a. Understanding the design and operation of CT systems. b. Understanding imaging parameters and scan protocols. c. Understanding post processing techniques, including multi-planar reformats and volume imaging. d. Being skilled in both performance and evaluation of common unenhanced and contrast CT images of the body. e. Understanding patient/client preparation and aftercare. f. Understanding of contrast timing in CT acquisition, including contrast delivery systems. g. Estimating dose levels associated with a variety of CT scans.
6. Describe the principles and clinical applications of angiography and interventional techniques	<ul style="list-style-type: none"> a. Understanding the design and operation of angiography systems including contrast delivery systems. b. Understanding angiographic image acquisition and image registration. c. Understanding aseptic techniques, contrast and other delivery systems, diagnostic catheters, interventional devices. d. Having knowledge of angiographic anatomy and common pathologies displayed using angiography. e. Understanding patient/client preparation and post-procedure care requirements of contrast delivery systems. f. Understanding the use of angiography as a diagnostic and therapeutic tool. g. Having knowledge of post processing options.
7. Describe how 3D datasets are produced	<ul style="list-style-type: none"> a. Being skilled in the construction of 3D images through the manipulation of 3D datasets. b. Understanding the potential of 3D images to be used for quantitative and qualitative purposes.

Comment [UniSA20]: Consider adding more depth in this capability to include radiography adaption in theatre.

Comment [UniSA21]: + consider an addition about evaluation of fluoroscopic images.

Comment [UniSA22]: Consider putting this capability in the core section

Comment [UniSA23]: Inclusion of physical principles of image acquisition

Comment [UniSA24]: And their adaptation to common pathological presentations

Comment [UniSA25]: The term skilled is subjective. ? leave out of statement or include a definition in the glossary

Comment [UniSA26]: In addition consider usage and amount of contrast.

Comment [UniSA27]: This is included in Domain 5 (c.)

Comment [UniSA28]: It was thought that these capabilities were high order for a new graduate ie to be skilled at the construction of all 3D images. ? Consider specific capabilities here ie specific 3D datasets.

Comment [UniSA29]: This statement needs more clarity.

What diagnostic radiography practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry or re-entry to the profession
8. Describe the principles and applications of MR imaging	<ul style="list-style-type: none"> a. Understanding the MR image production b. Understanding the hazards associated with MR imaging. c. Understanding the clinical context for MR examinations. d. Knowing the protocols applicable to neurological MRI in adult patient/clients.
9. Describe the principles and applications of Ultrasound imaging	<ul style="list-style-type: none"> a. Knowledge of the physics of ultrasound image production b. Knowledge of the strengths and weaknesses of ultrasound imaging c. Knowledge of common ultrasound examinations including patient/client preparation

Comment [UniSA30]: Consider putting this capability in the core section as all streams should be able to describe principles and applications of MR imaging

Comment [UniSA31]: Consider changing this capability to reflect a knowledge of the protocol parameters, rather than specific protocols at this level

Comment [UniSA32]: Unsure as to why are the protocols are restricted to neurological presentations only

Comment [UniSA33]: There was a concern that different clinical departments have different protocols for MRIs. Consider modifying this statement to incorporate student understanding of the underpinning principles behind protocols to allow for this variation.

Comment [UniSA34]: This statement is included in 6A, B and C. Consider adding to core statement

Comment [UniSA35]: This is thought to be common to all 3 streams and so consider included it in the core area ie domain 6

Comment [UniSA36]: This term may be subjective. Consider changing to uses and applications of U/S

Consider restructuring Domain 6B to combine similar elements and avoid repetition in NM capabilities that are common to all NM practice. In addition, the language used in this domain's capabilities is different to the language used in 6A and 6C. The language should be consistent for all streams . For example having knowledge of.... Rather than knowing.... The comments below give some examples of this, however it is strongly believed that this Domain needs additional thought and consideration to clearly outline capabilities that should be demonstrated for entry or re-entry into the NM profession.

Domain 6B: Practice in nuclear medicine

What nuclear medicine technology practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry or re-entry to the profession
1. Implement the preparation of common radiopharmaceuticals consider combining 1. and 3. In this section	a. Performing the elution and quality control of the $\text{Mo}^{98} \rightarrow \text{Tc}^{99m}$ generator. b. Having the ability to assay the eluate and prepare the common radiopharmaceuticals including correct volume and assay of eluate . c. Having sound knowledge of dose calibrators.
2. Explain normal biodistribution of commonly used radiopharmaceuticals	a. Understanding biodistribution and determining whether it is normal, altered or unexpected. b. Understanding biodistribution as it pertains to breast feeding mothers and be able to give appropriate instructions.
3. Implement the assessment of purity of radiopharmaceuticals	a. Performing quality control on all radiopharmaceuticals and being able to assess the purity of the radioisotope including: <ul style="list-style-type: none"> - radionuclide purity - radiochemical purity, and - chemical purity.
4. Implement CT imaging for nuclear medicine imaging	a. Understanding the design and operation of CT systems. b. Understanding imaging parameters and scan protocols. c. Understanding post processing techniques, including multi-planar reformats and volume imaging. d. Understanding patient/client preparation. e. Estimating dose levels associated with a variety of CT scans .

Comment [UniSA37]: This statement needs clarity. The QC on the generator is performed by the manufacturer and the QC of the eluate is performed by the NM practioner. It is believed that this statement needs to be separated and more clearly expressed.

Comment [UniSA38]: Consider re-wording correct volume to appropriate volume. Assay of the eluate should be included with the use of dose calibrators.

Comment [UniSA39]: This capability is repetitive within itself and discusses 2 separate skills: 'Having the ability to assay (and QC) the eluate' and 'preparing radiopharmaceuticals to an appropriate volume. Consider separating into 2 capabilities.

Comment [UniSA40]: Consider using describe (as in Domain A and C)

Comment [UniSA41]: Consider combining with point 10. And delete repetition

Comment [UniSA42]: QC is not performed on [all](#) RP's as some are pre-done. Ie. 123-Iodine.

Comment [UniSA43]: CT is seen as a core area, so consider removing from NM specific domain

Comment [UniSA44]: If this is not considered core, then this section should read as Domain 6A, 5

What nuclear medicine technology practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry or re-entry to the profession
5. Implement routine SPECT CT and planar imaging	<ul style="list-style-type: none"> a. Performing common (see guideline) planar and SPECT/CT studies. b. Knowing the standard nuclear medicine planar projections for each body area. c. Performing patient/client positioning for the best diagnostic outcome. d. Having comprehensive knowledge of patient/client preparation e. Having comprehensive knowledge of appropriate dosage of both isotope and CT for each patient/client. f. Knowing the contraindications or limitations of the particular study. g. Having sound knowledge of nuclear medicine gamma cameras. h. Being skilled in the evaluation of nuclear medicine images and the application of nuclear medicine criteria to these images. i. Having sound knowledge of the principles of SPECT reconstruction. j. Knowing the post processing options.
6. Implement common PET/CT imaging ⁵	<ul style="list-style-type: none"> a. Performing patient/client positioning for the best diagnostic outcome. b. Having the knowledge and the ability to use appropriate dosage of both isotope and CT for each patient/client. c. Having sound knowledge of PET/CT scanners. d. Knowing the contraindications or limitations of the particular study. e. Being skilled in the evaluation of PET/CT images and the application of PET/CT criteria to these images. f. Knowing the post processing options.
7. Describe how 3D datasets are produced	<ul style="list-style-type: none"> c. Being skilled in the construction of 3D images through the manipulation of 3D datasets.

Comment [UniSA45]: It is unsure why these have been grouped together

Comment [UniSA46]: Use of term common should be removed or included in the glossary for more clarity

Comment [UniSA47]: The guidelines were not included in this document.

Comment [UniSA48]: Consider rewording to Having knowledge of... to be consistent with 6A and C)

Comment [UniSA49]: typo

Comment [UniSA50]: a and d These are general NM skills and do not need to be identified in the different areas. I.e. knowing the contraindications or limitations of a particular study is common to all NM procedures.

Comment [UniSA51]: The term skilled is subjective. ? leave out of statement or include a definition in the glossary

Comment [UniSA52]: This comment requires more clarity

Comment [UniSA53]: This statement is included in 6 A, B and C. Consider adding to core statement

Comment [UniSA54]: This begins with points c. and d.

⁵ The PET/CT imaging procedures intended to be covered by the capability statement are those listed in the Medicare Benefits Schedule (MBS)

What nuclear medicine technology practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry or re-entry to the profession
	d. Understanding the potential of 3D images to be used for quantitative and qualitative purposes.

8. Implement the delivery of nuclear medicine radioisotope therapies	<ul style="list-style-type: none"> a. Calculating the dose and decay of therapy doses b. Knowing lesser used therapies, such as S.I.R.T., Y^{90}, MIBG. c. Understanding the difference between a radiation therapy dose and a diagnostic dose, as it affects the patient/client, health practitioner and the general public
9. Demonstrate a broad and current knowledge of various delivery systems of radioisotopes for diagnostic studies/therapies	<ul style="list-style-type: none"> a. Understanding appropriate dose delivery systems including arterial, oral, I.V and inhalation. b. Being able to gain intravenous access in a safe, aseptic manner.
10. Demonstrate a broad and current knowledge of the normal biodistribution of radioisotope therapies	<ul style="list-style-type: none"> a. Identifying whether the bio-distribution is normal, altered or unexpected.
11. Describe how to undertake common in vivo and in vitro lab procedures	<ul style="list-style-type: none"> a. Performing safe aseptic blood labelling procedures. b. Understanding <i>in vitro</i> laboratory procedures, such as Cr GFR, Cr RBC mass c. Identifying whether results of <i>in vitro</i> laboratory procedures are normal, altered or unexpected
12. Demonstrate a broad and current knowledge of operation of ancillary laboratory equipment	<ul style="list-style-type: none"> a. Being able to count samples using a well counter. b. Knowing how to use a centrifuge safely. c. Knowing how use a fume hood safely.

Comment [UniSA55]: This is a subjective descriptor. Consider re writing or add 'lesser used' to the glossary to make this clear to stakeholders. Does this differ between different departments.

Comment [UniSA56]: This could be misinterpreted as the radiation therapy discipline. Consider re-wording

Comment [UniSA57]: These will be difference in different states and departments. Consider re-wording to include this possibility ie use the word common in vitro lab procedures and include a definition of term common in glossary.

Domain 6C: Practice in radiation therapy

What radiation therapy practitioners must be able to do, in addition to the capabilities required under domain 6	Ways that this capability will be demonstrated at entry to the profession
1. Demonstrate a broad and current knowledge of treatment planning and of all imaging and treatment modalities used in current standard techniques for radiation therapy practice	<ul style="list-style-type: none"> a. Applying their skills and knowledge in using CT simulation to produce optimal scans for radiotherapy planning. b. Understanding the concept of image co-registration for MRI/PET planning scans. c. Being able to produce standard 3D radiotherapy treatment plans using computerised planning systems. d. Knowing the concepts for generating an IMRT or a VMAT treatment plan e. Understanding radical and palliative treatment doses and acceptable dose limits to critical structures.
2. Demonstrate an understanding of the radiation physics involved in treatment planning	<ul style="list-style-type: none"> a. Understanding the physical and biological science related to 3D treatment planning. b. Understanding the concept for beam modification in treatment planning.
3. Demonstrate a broad and current understanding of current treatment simulation techniques related to radiation therapy	<ul style="list-style-type: none"> a. Understanding patient/client positioning. b. Knowing which imaging modality/s is best suited for a particular planning procedure.
4. Demonstrate an understanding of stabilisation devices related to radiation therapy	<ul style="list-style-type: none"> a. Understanding the immobilisation required for a particular radiation therapy procedure and/or treatment technique. b. Fabricating immobilisation devices and ancillary equipment required in radiation therapy. c. Recognising limitations/restrictions in the use of stabilisation devices.
5. Demonstrate a broad and current knowledge of current treatment techniques related to radiation therapy	<ul style="list-style-type: none"> a. Interpreting and delivering contemporary treatment techniques from standard information as delivered by treatment planning systems b. Understanding legislative requirements for current treatment delivery recording systems. c. Understanding treatment verification.

Comment [UniSA58]: A definition would be needed about what constitutes 'standard'

Comment [UniSA59]: Word current is stated twice in this sentence consider deleting the first iteration.

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Comment [UniSA60]: Some clarity is needed about this statement

	<ul style="list-style-type: none"> d. Understanding the limitations and restrictions of treatment verification systems. e. Understanding image guided radiation therapy technology for image matching.
6. Implement CT imaging for oncologic imaging	<ul style="list-style-type: none"> a. Understanding the design and operation of CT systems. b. Understanding imaging parameters and scan protocols. c. Understanding post processing techniques, including multi-planar reformats and volume imaging. d. Being skilled in both performance and evaluation of common unenhanced and contrast CT images of the body. e. Understanding patient/client preparation. f. Understanding of contrast timing in CT acquisition, including contrast delivery systems. g. Estimating dose levels associated with a variety of CT scans.
7. Describe how 3D datasets are produced	<ul style="list-style-type: none"> e. Being skilled in the construction of 3D images through the manipulation of 3D datasets. f. Understanding the potential of 3D images to be used for quantitative and qualitative purposes.
8. Knowledge of adjunct radiation therapy techniques	<ul style="list-style-type: none"> a. Understanding brachytherapy, superficial radiotherapy, radiosurgery/stereotactic radiotherapy, paediatric radiotherapy, total body radiation and proton therapy. b. Knowing the physics associated with each of the areas.

Comment [UniSA61]: Consider putting this capability in the core section

Comment [UniSA62]: Consider replacing with Perform and evaluate common....

Comment [UniSA63]: This CT section should read as Domain6A, 5

Comment [UniSA64]: This statement is included in 6 A, B and C. Consider adding to core statement

Comment [UniSA65]: Consider changing to Specialty RT techniques

Comment [UniSA66]: Consider replacing with understand



Glossary

ALARA Principle	Refers to the principle that exposure to radiation from justified activities should be kept as low as reasonably achievable, economic and social factors being taken into account ⁶
RIS (Radiology Information System)	A computerised database used to store, manipulate, and distribute patient/client radiological data and images
HIS (Hospital Information System)	A system used by a hospital or clinic to manage information including patient, clinical, ancillary and financial data
PACS (Picture Archiving and Communication System)	A system used to acquire, store, retrieve, present and distribute medical images
Patient/client	Includes all consumers of health care services

Comment [UniSA67]: RIS, HIS and PACS are not used in the document (or else I missed it) and so should not be included in the glossary.

⁶ Source: ARPANSA Code of practice 2008