Professional capabilities for Medical Radiation Practice in Australia

Medical Radiation Practice Board
Ahpra

The artwork and artist

By Jedess Hudson

Jedess Hudson is the creator of this design. Jedess is a descendant of the Ewamian and Western Yalanji people of North Queensland. An established creative, she has made significant contributions to the art and community sector for many years.

Throughout her creative journey, Jedess has drawn deeply from her traditional homelands. Elements of the land, seasons, bush tucker, flora, and fauna are integral to her art practice, reflecting her strong connection to her heritage.

Growing up, Jedess was taught to be keenly aware of her surroundings, especially in nature, and to analyse the diverse landscape that shapes her work. This awareness continues to inspire and inform her artistic expression.

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Healing light: A Journey of Unity and Understanding

Across the vast and diverse landscape of Australia the Professional capabilities for medical radiation practice unites the three professions of diagnostic radiography, radiation therapy and nuclear medicine practice with a shared mission of healing, understanding and connection.

The design speaks many different stories and traditions. It symbolises the medical radiation practice profession and also reflects the deep cultural connections that underscore the practice of healing.

At the centre design is a yarning circle used by Aboriginal and Torres Strait Islander people for millennia to teach and learn, to build respectful relationships and to share history and culture. The yarning circle also symbolises the timeless connection that Aboriginal and Torres Strait Islander peoples have with the land and seas and their ways of knowing, being and doing. Around this sits three circular patterns which represent the three professions of medical radiation practice. Together these elements combine to represent the sun, a lifegiving force, that has been revered by Aboriginal and Torres Strait Islander cultures for millennia. Just as the sun's energy sustains life, medical radiation practitioners harness the power of the sun, the "healing light" to diagnose and treat their patients.

The connection between land, sea and sky is central to the artwork, just as it is central to the lives of the First Nations people who have cared for this land for thousands of years. Our connection with each other is united in purpose, grounded in connection, and strengthened by diversity.

The flowing lines that radiate outwards and intricate patterns in the design depict rivers, wind and the movement of energy across the land. The segments created by the winds and rivers separate segments to reflect the eight states and territories and convey the interconnectedness between Country, people, and spirit. The patterns echo the significance of songlines, the pathways that weave across the land and sea, connecting places of cultural importance and guiding the journey of learning and healing. Similarly, the stars provided by the night sky provide waypoints for travel, trace a pathway through seasons, and are indicators for hunting and gathering practices. The outward-reaching ripple demonstrates the flow on effects of healing, showing the shared and communal nature of our well-being. Healing is not just physical, but also deeply spiritual.

Introduction

The Medical Radiation Practice Board of Australia (the Board) has powers under the Health Practitioner Regulation National Law, as in force in each state and territory (the National Law), to develop standards, codes and guidelines about the eligibility of individuals for registration in the medical radiation practice profession.

The Board first developed and published the *Professional capabilities for medical radiation practitioners* (the *Professional capabilities*) in 2013, which applied to entry-level medical radiation practitioners seeking to qualify for registration as a diagnostic radiographer, a nuclear medicine technologist or a radiation therapist. Since then, there have been technological developments and changes to the scope and role of medical radiation practitioners, in addition to developments in capability frameworks.

In 2019, the Board reviewed and updated the first edition of the *Professional capabilities*. Building on the 2019 edition, the Board further updated the professional capabilities in 2024. This latest update reflects recent advancements in medical radiation practice, ensuring the *Professional capabilities* remain contemporary and fit-for-purpose for the current scope of practice of medical radiation practitioners in Australia.

Purpose of the Professional capabilities for medical radiation practitioners

The professional capabilities identify the knowledge, skills and professional attributes needed to safely and competently practise as a diagnostic radiographer, a nuclear medicine technologist or a radiation therapist in Australia. They describe the threshold level of professional capability needed for both initial and continuing practice.

Format of the Professional capabilities for medical radiation practitioners

The format of the professional capabilities draws on the CanMEDS competency framework, developed by the Royal College of Physicians and Surgeons of Canada. A key feature of the CanMEDS framework is the thematic arrangement of competencies based on the roles of practitioners in practice. The framework has been adopted and adapted by many other health professions in Australia and internationally to describe the competencies that are 'essential' at the beginning of, and throughout, a practitioner's career.[1]

In applying the CanMEDS approach, the *Professional capabilities for medical radiation practitioners* are organised into six domains that cover capabilities common to all divisions of medical radiation practice and three sub-domains related to the different divisions of medical radiation practice. As shown in **Figure 1** below, each domain consists of key capabilities and enabling components. Explanatory notes are also provided where required to provide additional information.

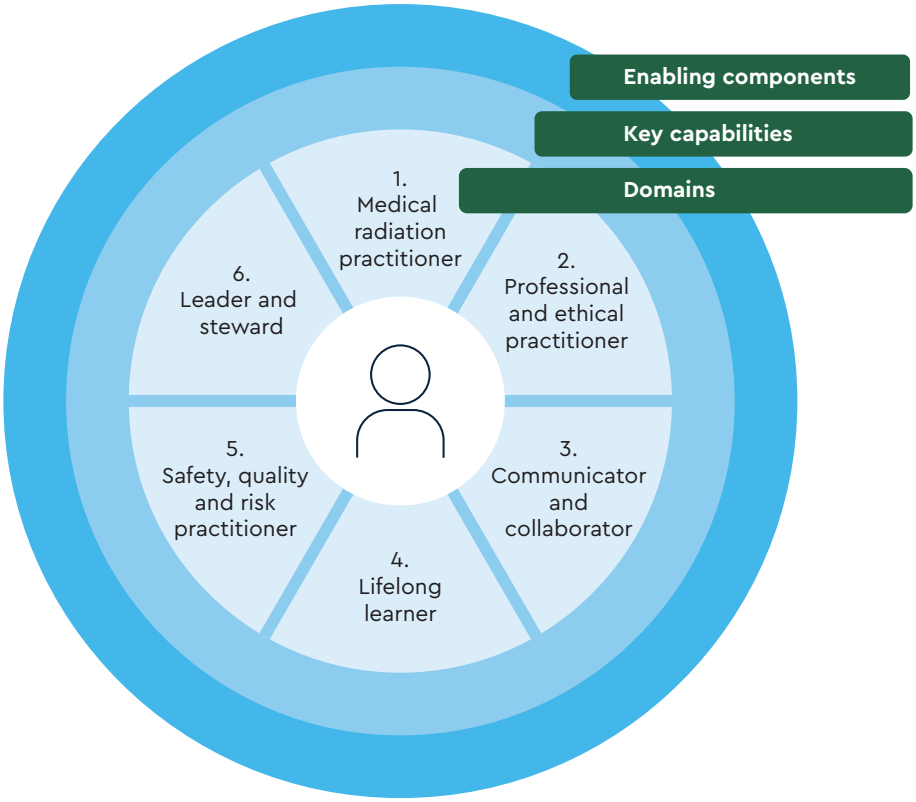

Figure 1: Format of the medical radiation practice professional capabilities

1 Royal College of Physicians and Surgeons of Canada. (2015). CanMEDS 2015 Physician Competency Framework. CanMEDS Framework (royalcollege.ca)

Domains

The professional capabilities are thematically arranged into six domains, as shown in **Table 1**.

Table 1: The six domains included within medical radiation practice professional capabilities

Domain 1	Medical radiation practitioner • Domain 1A: Diagnostic radiographer • Domain 1B: Nuclear medicine technologist • Domain 1C: Radiation therapist
Domain 2	Professional and ethical practitioner
Domain 3	Communicator and collaborator
Domain 4	Lifelong learner
Domain 5	Safety, quality and risk management practitioner
Domain 6	Leader and Steward

Key capabilities

The key capabilities describe the key features of safe and competent practice in a range of contexts and situations of varied complexity and uncertainty. During any one procedure or treatment, practitioners are expected to demonstrate key capabilities from various domains. This recognises that competent professional practice is more than a sum of each discrete part and needs an ability to draw on and integrate the breadth of capabilities to support overall performance.

Enabling components

The enabling components describe the essential and measurable characteristics of the corresponding key capabilities and facilitate assessment of performance in the practice setting. Medical radiation practitioners must be able to demonstrate all enabling components for all key capabilities for safe and competent practice. This includes applying, adapting and synthesising new knowledge from experience to continually improve performance.

The enabling components include different ways of demonstrating capability, including:

- **Apply knowledge / principles of** indicates a practitioner is expected to apply detailed knowledge in the practice setting.
- **Understand** indicates a practitioner is expected to apply broad knowledge and understanding of information for safe practice.
- **Performance, e.g. 'perform', 'identify', 'respond' and/or 'operate'**, are used for the majority of enabling components – these are abilities needed in the practice setting.

Explanatory notes

Explanatory notes are provided for clarification and additional information. Where a note includes a list of items e.g. of legal responsibilities or equipment, the wording used indicates when some or all the listed items are needed:

- If a note states, 'must include', all items on the list are needed.
- If a note states, 'may include', all items on the list are not needed, any item on the list may be demonstrated.
- If a note states, 'but is/are not limited to', additional items to those listed may be demonstrated to enable flexibility and innovation.
- If there is no note, all items listed in the enabling component and/or capability statement are needed.

Professional capabilities to recognise socio-cultural factors in delivering care

In this document, the professional capabilities reinforce the importance of medical radiation practitioners recognising the unique needs, values, and circumstances of individual patients, their families and carers. Key capabilities to enable culturally safe, sensitive and person-centred care are integrated through each of the six domains to promote equitable and respectful approaches to care.

Cultural competence

Cultural competence is defined as a set of consistent behaviours, attitudes, and policies that come together in a system, agency, or among professionals and enable that system, agency, or those professionals to work effectively in cross-cultural situations.

The word "culture" is used because it implies the integrated pattern of human behaviour that includes thoughts, communications, actions, customs, beliefs, values, and institutions of a racial, ethnic, religious, or social group. The word "competence" is used because it implies having the capacity to function effectively. A culturally competent system of care acknowledges and incorporates – at all levels:

- the importance of culture;
- the assessment of cross-cultural relations;
- vigilance towards the dynamics that result from cultural differences;
- the expansion of cultural knowledge, and
- the adaption of services to meet culturally unique needs.

Medical radiation practitioners in Australia must be able to work effectively with people from various cultures that may differ from their own. Culture may include, but is not limited to, age, gender, sexual orientation, race, socio-economic status (including occupation), religion, physical, mental or other health needs, ethnicity and health service culture. A holistic, patient/client and family-centred approach to practice requires cultural competence.

Cultural safety

All health practitioners in Australia, including medical radiation practitioners, need a working knowledge of factors that contribute to and influence the health and wellbeing of Aboriginal and Torres Strait Islander Peoples. These factors include history, spirituality and relationship to land, and other social determinants of health in Aboriginal and Torres Strait Islander communities.

The Board is part of the National Registration and Accreditation Scheme's (the National Scheme's) Aboriginal and Torres Strait Islander Health Strategy Group[2] (the Health Strategy Group) which published a *Statement of Intent* (the Statement) in July 2018. The Statement highlights the Health Strategy Group's intent to achieve equity in health outcomes between Aboriginal and Torres Strait Islander Peoples and other Australians to close the gap by 2031. Their vision is that patient/client safety for Aboriginal and Torres Strait Islander Peoples is the norm.

The definition of cultural safety has been developed for the National Scheme and adopted by the National Health Leadership Forum. The Health Strategy Group developed the definition in partnership with a public consultation process.

Definition

Cultural safety is determined by Aboriginal and Torres Strait Islander individuals, families and communities.

Culturally safe practise is the ongoing, critical reflection of other health practitioners' knowledge, skills, attitudes, practising behaviours and power differentials in delivering safe, accessible and responsive healthcare free from racism.

To ensure culturally safe and respectful practice, health practitioners must:

a. Acknowledge colonisation and systemic racism, social, cultural, behavioural and economic factors which impact individual and community health.
b. Acknowledge and address individual racism, their own biases, assumptions, stereotypes and prejudices and provide care that is holistic, and free of bias and racism.
c. Recognise the importance of self-determined decision-making, partnership and collaboration in healthcare, which is driven by the individual, family and community.
d. Foster a safe working environment through leadership to support the rights and dignity of Aboriginal and Torres Strait Islander peoples and people from culturally and linguistically diverse backgrounds.

Intersectional approaches to care in medical radiation practice

This document supports an intersectional approach to person-centred care delivered by medical radiation practitioners. The *Professional capabilities* recognise that different aspects of a person's identity interact and shape their experiences of healthcare. The *Professional capabilities* emphasise that safe care – the delivery of equitable and effective care for every individual, recognises the diversity of overlapping socio-cultural factors that intersect to impact person's experience of healthcare which includes but is not limited to:

- Aboriginal and Torres Strait Islander Peoples;
- culturally and linguistically diverse populations;
- religious or faith-based beliefs;

2 For more information on the National Scheme's Health Strategy Group, see https://www.ahpra.gov.au/About-AHPRA/Aboriginal-and-Torres-Strait-Islander-Health-Strategy.aspx

- neurodiverse people;
- people living with disability;
- lesbian, gay, bisexual, transgender, intersex, queer/questioning, asexual (LGBTIQA+) people;
- children and young people;
- older people, and
- people living in rural and remote communities.

The Professional capabilities also acknowledge that consideration for intersecting factors, such as language barriers, cultural differences, or accessibility to services, is essential to providing effective, person-centred care that caters to the diverse needs of all patients.

Family, sexual and domestic violence

The Board recognises the gendered drivers of violence, and that women and children are disproportionately affected and experience more harm. Women are also at higher risk of violence during pregnancy and in the period immediately after birth. Family violence occurs in all cultures and communities and impacts people of varied personal identities, backgrounds, religions, ages, genders, sexual orientations, education, income levels and social positions. Some people are further impacted by other forms of systemic and structural inequality, exacerbating their experiences of violence.

It is important that health practitioners responding to family violence understand its serious consequences and the barriers to disclosure that victim-survivors can experience. They have a vital role to play in the early detection, support, referral, documentation of incidents, and delivery of specialised treatment for people experiencing family violence.

Health practitioners are often the first point of contact for many people who have experienced or are experiencing family violence. They play an essential role in recognising family violence and in responding sensitively, respectfully, and safely to prevent further harm. This includes referring victim-survivors to specialist services where appropriate.

Medical radiation practitioners are often in a unique position to recognise and respond to signs of family, sexual and domestic violence, given their close, and often private, consultation opportunities with patients. The responsibility and commitment to the role of medical radiation practitioners to address family, domestic and sexual violence is outlined further in **Domain 2: Professional and Ethical Practitioner**.

Definition

Family violence is defined differently in legislation in each Australian state and territory. The Board along with other health regulators in Australia[3] takes a broad definition of family violence acknowledging that it encompasses violence between family members, as well as domestic violence between intimate partners, including a current or previous partner, regardless of whether they lived together. It also refers to carers, extended family, and the broader range of marital and kinship relationships in which violence may occur. Family violence can also refer to situations where other family members of the perpetrator are abusive towards the victim-survivor or arrange for violent acts to be committed against the victim-survivor. Children experience family violence and its impacts in their own right, whether or not they experience the violence directly. Family violence includes, but is not limited to:

- coercive control, which is violent, threatening, isolating or other behaviour by a person to coerce or control a member of the person's family or cause the family member to be fearful;
- homicide;
- physical violence and abuse;
- sexual violence;
- reproductive abuse;
- emotional and psychological abuse;
- harassment and stalking;
- elder abuse;
- financial abuse;
- technology-related violence;
- social violence; and
- spiritual violence.

3 2024 Joint Position on Family Violence by Regulators of Health Practitioners https://www.ahpra.gov.au/Resources/Joint-Position-on-Family-Violence.aspx

The Board is committed to the national priority to reduce and ultimately end family, domestic and sexual violence outlined in the *National Plan to End Violence against Women and Children 2022–2032* and supports the active role that registered health professionals play in meeting this priority[4]. The professional capabilities acknowledge the need for medical radiation practitioners to be equipped with the knowledge and skills to effectively support the identification of, and responses to, suspicions or disclosures of family, sexual, and domestic violence.

NB: updated guidance on minimum capabilities for medical radiation practitioners with respect to Family, sexual and domestic violence may be published by the Board within the lifecycle of these Professional capabilities.

Uses of the *Professional capabilities for medical radiation practitioners*

The Board has statutory functions as a regulator of the medical radiation practice profession in Australia. One of the Board's statutory functions is to "register suitably qualified and competent persons in the health profession"[5].

The Board uses the *Professional capabilities* as a reference point for a threshold of competence when exercising its statutory functions including for:

- registration of individuals who complete an approved medical radiation practice program of study in Australia (see the section The Professional capabilities and accreditation of medical radiation practice education programs in Australia below for more details);
- registration of individuals who are relying on medical radiation practice qualifications issued in other countries to qualify for general registration in Australia;
- re-registration of individuals who were previously registered as a medical radiation practitioner in Australia; and
- evaluation of a registrant whose level of competence to practise may pose a risk of harm to the public, for example, if the Board receives a concern or notification about that registrant.

The professional capabilities may also be used:

- by universities for the development of medical radiation practice curricula (learning and assessment); and
- to communicate to the public, consumers, employers, insurance companies and other stakeholders the standards that they can expect from medical radiation practitioners.

The Board recognises that other organisations and individuals may use the professional capabilities as a reference point for a threshold of competence for other purposes. This may include: registrants' self-assessment of their competence; employers' performance evaluation ;and management of registered medical radiation practitioners in the workplace and agencies responsible for health policy or health workforce strategy.

The *Professional capabilities* and accreditation of medical radiation practice education programs in Australia

The Board is responsible for the regulation of medical radiation practitioners and, in July 2012, established the Medical Radiation Practice Accreditation Committee (the Committee) under the National Law.

The Committee is responsible for accrediting education providers and medical radiation practice programs of study. It assesses programs against the *Medical radiation practice accreditation standards* (the accreditation standards) that were developed by the Committee and approved by the Board. The Committee accredits programs that meet the accreditation standards and monitors programs to ensure they continue to meet the standards.

The accreditation standards refer to the professional capabilities. The accreditation standards require education providers to design and implement a program where learning outcomes and assessment tasks map to all the professional capabilities. Accreditation of a program therefore provides assurance to the Board and the community that graduating students from the medical radiation practice program have the knowledge, skills and professional attributes that are necessary for safe and competent medical radiation practice in Australia.

4 Campbell, E., Fernande, T., Gassner, L., Hill, J., Seidler, Z., Summers, A. Unlocking the Prevention Potential: Accelerating action to end domestic, family and sexual violence. https://www.pmc.gov.au/sites/default/files/resource/download/unlocking-prevention-potential.pdf

5 Section 35(1)(a) of the Health Practitioner Regulation National Law Act as in force in each state and territory in Australia.

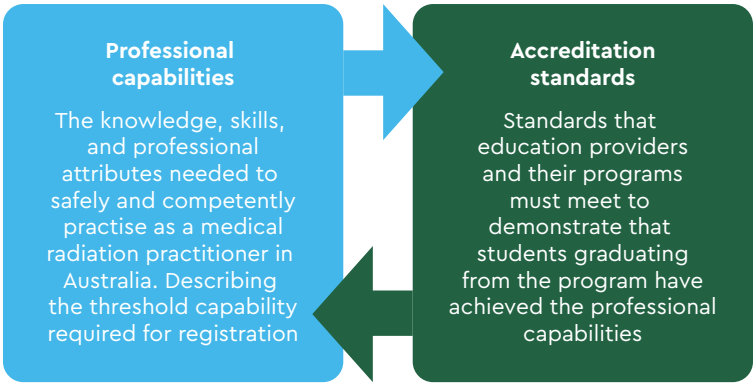

Figure 2: Relationship between professional capabilities and accreditation standards

Concept of threshold professional capability and competence

Professional capability is the ability to take appropriate and effective action to formulate and solve problems in both familiar and unfamiliar, complex and changing settings[6]. Competence refers to the ability to perform specific tasks to the standard of performance needed in the workplace[7,8]. The definition of competence needed for the job will change as the job role evolves.

While competency is a part of capability, capability extends beyond competency by incorporating adaptability, critical thinking, and decision-making to perform a job effectively in the real-world, often with novel or unpredictable conditions.

Capable people have high levels of self-efficacy, know how to learn, work well with others and are creative[9,10]. A practitioner's capability will expand and improve as they gain professional experience. Professional capability reflects how a practitioner uses their professional judgement, decision-making skills and experiential knowledge to apply their scientific knowledge, practical skills and ability in any given situation.

A capability framework can be pitched at the level of ongoing practice, rather than being designed for a specific point-in-time assessment. It focuses on activities at the broad level that apply across the profession and allow individuals to develop their capabilities in complex and continually evolving work contexts. The enabling components in these professional capabilities describe the threshold behaviours for safe and competent practice.

The enabling components that describe elements for more advanced levels of practice are not covered in this document. That is, this document describes capability at the level of a beginning practitioner, rather than that of an expert.

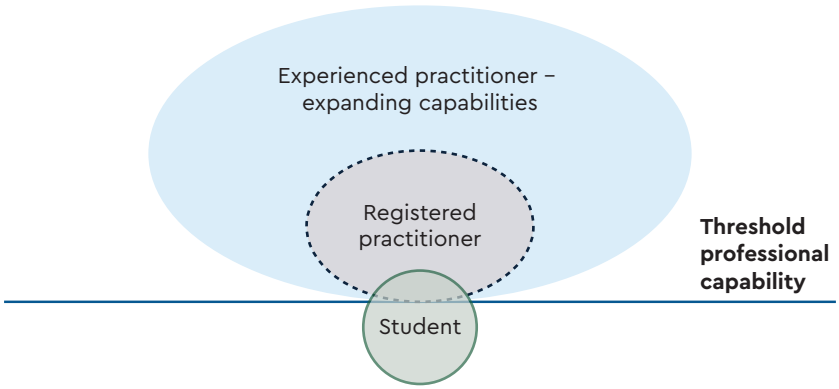

Figure 3: Threshold capability

6 Davis L and Hase S. 'Developing capable employees: the work activity briefing', Journal of Workplace Learning. 1999;8: 35–42.
7 Department of Health and Human Services State of Victoria. Allied health: credentialing, competency and capability framework (revised edition). Melbourne: State of Victoria Department of Health and Human Services; 2016 [available from https://www2.health.vic.gov.au/health-workforce/allied-health-workforce/allied-health-ccc-framework].
8 Australian Skills Quality Authority. Users' Guide to the Standards for RTOs 2015, Canberra: Australian Government 2017 [available from: www.asqa.gov.au/standards].
9 Lester S. Professional standards, competence and capability. Higher Education, Skills and Work-based Learning. 2014;4(1):31–43
10 Cairns, L & Malloch, M "Lifelong Learning for Capability" 2024. Springer. ISBN 978-3-031-68239-1 ISBN 978-3-031-68240-7 (eBook) https://doi.org/10.1007/978-3-031-68240-7

Maintenance of professional capability

Professional capabilities are relevant throughout a registered medical radiation practitioner's career. Registered medical radiation practitioners need to maintain at least the threshold level of professional capability in all areas relevant to their practice and maintain the currency of their skills and knowledge through continuing professional development.

The level of professional capability and scope of practice for practitioners are likely to change over time as the profession advances and as new roles emerge in the evolving healthcare environment. Practitioners may move into new roles that have different responsibilities. These roles may no longer include the direct provision of patient care, for example, in research, education or management. With changes to a practitioner's scope of practice, some of the key capabilities may no longer be relevant to their practice.

Many medical radiation practitioners strive to excel when providing services and maintain a level of professional capability above the threshold. If a medical radiation practitioner fails to maintain at least the threshold level of professional capability in all areas relevant to their practice, they could pose a risk to the public.

The *Professional capabilities* and assessment of competence

The *Professional capabilities* provide a consistent reference point for assessing an individual's performance in the relevant context of medical radiation practice. The key capabilities and enabling components describe abilities and skills that can be assessed in practice and provide a reference point of threshold competence that can be applied across a range of contexts of practice. This includes assessment of:

- a medical radiation practitioner's performance in the context of the workplace or a simulated setting for maintenance of registration;
- a medical radiation practice student's performance in the context of a clinical placement or simulated setting for education purposes; and
- individuals who qualify as medical radiation practitioners in other countries in the context of a competence assessment for initial registration in Australia.

The professional capabilities are not designed as a stand-alone means of measuring competence. The document supports the establishment of additional performance indicators and rating scales for valid measurement of a medical radiation practitioner's performance for different purposes, in different settings and across different scopes of practice.

The context of a medical radiation practitioner's practice may not be limited to (and may not necessarily include) direct interaction with patients. Many of the abilities described in the key capabilities and enabling components are needed when registered medical radiation practitioners work in management, administration, education, research, policy development, advisory contexts, regulatory or other contexts that impact on safe, effective delivery of medical radiation practice services.

The performance indicators and rating scales for valid measurement of practitioners' competence depend on the purpose of the assessment of an individual's competence and the context of the medical radiation practice in which the assessment is taking place.

The *Professional capabilities* and practice in computed tomography (CT) imaging

The 2019 *Professional capabilities* document described the key capabilities relating to CT imaging independently, with their individual inclusion in **Domain 1A, Domain 1B and Domain 1C** respectively. This document contains updated content related to CT imaging, with its inclusion as a capability common to all three divisions of practice.

The application of CT practice continues to evolve across the three divisions of medical radiation practice, principally driven by improvements in medical imaging and radiation therapy planning technology.

The professional capabilities cover the knowledge, skills and attributes needed by all diagnostic radiographers, nuclear medicine technologies and radiation therapists who use CT as part of their practice.

Professional capabilities for magnetic resonance imaging (MRI), ultrasound, mammographic imaging, and angiography

The 2019 *Professional capabilities* document described the key capabilities related to the use of MRI and ultrasound for medical radiation practitioners who use these modalities as part of their practice, within **Domain 1**. Professional capabilities relating to mammographic imaging were removed from the 2019 *Professional capabilities*, having previously been included in the 2013 version, and angiography was included as a key capability in **Domain 1A** only.

This document contains updated content related to MRI, ultrasound, mammographic imaging, and angiography as capabilities common to all three divisions of the register of medical radiation practitioners who use these modalities. These key capabilities and enabling components are outlined further within **Domain 1**.

Medical radiation practice professional capabilities and practice in ultrasound

It is important to note that sonographers are not regulated under the National Law, and the medical radiation practice capabilities do not establish frameworks or capabilities that seek to enforce any regulation of sonographers. The professional capabilities apply in the context of registered medical radiation practitioners only, therefore any reference to ultrasound practices applies to day-to-day practice by a registered medical radiation practitioner.

Medical radiation practice professional capabilities and practice in MRI

This document contains updated content related to the use of MRI in practice to address the requirements for a practitioner to use MRI safely and competently. This includes consideration for emerging MRI technology and its use in a range of different clinical practice settings. The professional capabilities apply in the context of registered medical radiation practitioners only.

Identifying urgent or unexpected findings

The Board outlines a policy for *Communicating safely – if urgent or unexpected findings are identified* to help medical radiation practitioners meet their obligations if urgent or unexpected findings are identified[11].

It is recognised that the formal report is the gold standard and the most appropriate way to communicate findings in medical images. If a medical radiation practitioner identifies something urgent or unexpected in a medical image, they must communicate this in a timely way to another health practitioner involved in the care of the patient. In most cases, the appropriate health practitioner to communicate urgent or unexpected findings to is the reporting practitioner. This allows the report writer to prioritise the production and communication of a formal report.

Medical radiation practitioners are expected to exercise professional judgement. If critical information emerges or there is a risk to patient care, timely communication of this information to clinicians involved in the care of the patient is essential.

The medical radiation practitioner must ensure that urgent or unexpected findings are shared with, and understood by, the appropriate persons. This may include the reporting practitioner, the requesting health practitioner and/or other health practitioners, for the immediate and appropriate management of the patient.

Health data, health informatics and digital health systems, including Artificial Intelligence (AI)

As emerging technologies, including Artificial Intelligence (AI), continue to evolve in relation to medical radiation practice, it is crucial that their implementation and use occurs both safely and responsibly.

The Board recognises that in Australia (at the time of writing), governance and regulation of AI in healthcare is evolving and occurs through a range of approaches, including privacy and consumer law, regulation of software as medical devices, and proposed governance arrangements through research and health organisations[12].

The Board has established some descriptions for the use of data, health informatics and digital health which are interconnected and relevant to the use of artificial intelligence. Using data and digital health capabilities appear in Domain 1, while capabilities for health informatics has been placed Domains 6.

The *Professional capabilities* emphasise that medical radiation practitioners must understand health data, sources of data and factors that impact safety, reliability and privacy. They must also understand how to use emerging technologies, including AI, use health data to deliver appropriate, safe, and effective person-centred care. This includes understanding how to use technology to support evidence-based clinical decision-making, appraising the ethical use of technology, and considering any potential impacts on patient safety and quality of care.

NB: updated guidance on minimum capabilities for medical radiation practitioners with respect to Digital Health including Artificial intelligence may be published by the Board within the lifecycle of the Professional capabilities.

11 Medical Radiation Practice Board of Australia. (2019). Communicating safely – if urgent or unexpected findings are identified

12 Australian Institute of Health Innovation. (2024). Literature review and environmental scan report: AI Implementation in Hospitals: Legislation, Policy Guidelines and Principles, and Evidence about Quality and Safety. artificial_intelligence_-_literature_review_and_environmental_scan.pdf (safetyandquality.gov.au)

Key capabilities and enabling components

Domain 1: Medical Radiation Practitioner

This domain covers the knowledge, skills and attributes a medical radiation practitioner needs in order to practise independently and deliver efficient, effective, and culturally safe, person-centred care.

Key capabilities in this domain are common to all three divisions of the register of medical radiation practitioners.

Key capabilities	Enabling components
1. Deliver efficient, effective, and culturally safe person-centred care.	a. Perform patient assessment and medical radiation examination/ treatment in accordance with patient need and preferences, legislation, registration standards, codes, and guidelines. b. Continually assess the patient's capacity to receive care, including factors or conditions that may affect the patient's behaviour and/or capacity to provide informed consent and undergo the procedure, and triage patients when needed. c. Identify patient preparation requirements and provide appropriate patient care before, during and after the examination/treatment. d. Recognise, evaluate, and make appropriate adjustments for social, cultural, personal, and environmental factors for each patient undergoing an examination or receiving treatment. e. Identify and make appropriate adjustments for patients who are vulnerable or otherwise most at risk, including for example pregnant patients and the fetus, breastfeeding patients, and children. f. Evaluate the purpose of the proposed examination or treatment and review existing protocols to deliver safe, high-quality care. Select the appropriate equipment, and triage patients according to their clinical presentation, national standards, and other relevant factors. g. Identify contraindications and limitations of medical radiation services. Recognise when an alternative examination or treatment may be more appropriate for a patient and communicate this to relevant other practitioners. h. Recognise circumstances of impending or acute physiological deterioration, including anaphylaxis and other adverse events. Respond to the person's needs in an appropriate and timely way, consistent with standards of safe and high-quality care. This includes calling for emergency help when needed and documenting actions taken. i. *All registered medical radiation practitioners must be trained and current in basic life support techniques that includes cardiopulmonary resuscitation (CPR), using automatic external defibrillator (AED) and management of anaphylaxis. Also see the Explanatory notes.* j. Apply quality criteria to assure image quality, evaluate medical images and identify any urgent and/or unexpected findings. If any urgent and/or unexpected findings are identified, take appropriate and timely action to ensure the immediate management of the patient.
2. Apply knowledge of anatomy, physiology and pathology to deliver safe, high-quality health services.	a. Apply knowledge of anatomy and physiology of the human body to practice. b. Apply knowledge of the scientific explanations underpinning disease and injuries affecting the human body to enable delivery of safe, high quality examinations, treatments, and screenings. c. Identify anatomical structures and physiological processes and frequently occurring injuries and diseases of the human body on medical images.

Key capabilities	Enabling components
3. Appropriately and accurately record, manage, and store clinical information.	a. Understand and comply with legal and ethical responsibilities for health data privacy, use, ownership, storage, retention and destruction in healthcare. b. Use health information systems to record and store health data, including patient history, examinations, treatments, and images, ensuring data is associated with the correct patient. c. Manage and integrate health data across different health information systems, recognising the interdependencies that may exist between them. d. Identify, respond or report data errors or inconsistencies, system failures, or incorrect patient-data associations to maintain accuracy and patient safety. e. Ensure health data (images, reports etc) are available to authorised persons or systems to facilitate efficient and co-ordinated patient care.
4. Use health data to improve clinical decision making and support safe patient care.	a. Understand the role of health data in enhancing clinical decision making, reducing errors and improving patient outcome. b. Understand the importance of accurate, complete, and reliable health data in delivering safe and effective healthcare services. c. Apply knowledge of confidentiality, ethics, and legal requirements to responsibly collect, store, link, and access health data from multiple sources, including patient-generated data. d. Evaluate the benefits, limitations, and risks associated with integrating data from multiple health data sources to maintain data integrity, security, and compliance while supporting safe and effective healthcare delivery. e. Identify and evaluate the credibility, relevance and quality of available health data, analytics and information to ensure evidence-based decision-making. f. Use relevant health data and informatics to inform clinical decisions, improve workflows, and enhance safe service delivery.
5. Appropriately and accurately use digital health systems, tools and services.	a. Use digital health systems, tools, and services, including health information management systems, appropriately and accurately in medical radiation practice. b. Understand regulatory and national frameworks for the safe use of artificial intelligence (AI) in healthcare. c. Understand the ethical challenges posed by artificial intelligence d. Understand the role of bias in artificial intelligence and how it may skew AI outputs. e. Understand how digital health systems may adversely impact health equity. f. Critically evaluate the risk and benefits of digital health systems used in connection with practice or provision of health services, identify potential impacts to patient safety, privacy or quality of care, and act to limit or manage risk. g. Advocate for the safe and justified use of emerging technology to promote safe and high-quality patient care. h. Uses digital health systems in partnership with patients to aid culturally and personally appropriate, informed decision making. i. Support health literacy for users of digital health systems, tools and services.
6. Understand and apply the different methods of imaging and treatment.	a. Understand the different imaging and treatment pathways in medical radiation practice. b. Understand the modalities and equipment used in the different imaging and treatment pathways across medical radiation practice. c. Operate equipment and apply knowledge of physics and laboratory procedures relevant to practice.

Key capabilities	Enabling components
7. Confirm the procedure according to clinical indicators.	a. Where relevant, understand the patient's clinical history, referral and current medical information to confirm that the requested or prescribed procedure is appropriate, drawing on knowledge of other imaging and treatment pathways. b. Determine the appropriate imaging and/or treatment protocols and priorities which consider the information collected during the interaction with the patient and knowledge of imaging and/or treatment options. c. Where appropriate, tailor the requested examination/treatment to an individual patient, considering available clinical information, advice from the multi-professional team and patient preferences.
8. Enable reproducibility of procedures and outcomes.	a. If available, review the patient's previous images, history, condition and presentation and consider the limitations/restrictions that may impact reproducibility imaging or treatment.
9. Safe and effective use of medicines.	a. Understand and apply biomedical sciences relevant to scope of practice b. Apply knowledge of medicines relevant to scope of practice c. Understand the regulation, governance and authorisation pathways for the use of medicines in Australia, consistent with national, state and territory legislative and regulatory frameworks. d. For safe and effective, person-centred use of medicines, i. gather information to assess and understand the persons / patient's needs, including their relevant health records ii. understand the medicine options available and choose suitable medicines, where appropriate consult with the multi professional team iii. apply the principles of Quality use of medicines (QUM) consistent with the National Prescribing Competencies Framework. iv. practice within the limits of scope of practice and in accordance with national care standards, federal and state legislation and local protocols. v. recognise and manage risks, precautions, contraindications, potential adverse effects and interactions associated with medicine use, including in vulnerable populations or in complex care settings. vi. actively monitor and evaluate the person's response to medicines, from initiation, continuation, and following cessation of a medicine vii. identify and manage adverse reactions or errors and when necessary, modify treatment in collaboration with the patient and other health professionals. viii. accurately document the use of medicines, detect and report errors, incidents or adverse events involving medicines ensuring communication with the healthcare team.
10. Perform Computed Tomography (CT)	a. Operate CT systems safely and effectively. b. Apply appropriate imaging parameters for the patient presentation. c. Adjust relative radiation dose levels appropriate to the individual patient, in particular for young patients. d. Collaborate in the design and evaluation of CT protocols. e. Perform and evaluate contrast and non-contrast CT examinations of the body and, where appropriate, modify them to consider patient presentation and clinical indications. f. Process data image sets, including multi-planar reformats and volume imaging. g. Record urgent or unexpected findings and communicate in a timely manner

Domain 1: Explanatory Notes

Recognising and responding to a patient's deteriorating condition should be interpreted in the context of the Australian Commission on Safety and Quality in Healthcare's *National consensus statement: essential elements for recognising and responding to clinical deterioration* (National Consensus Statement) and the National Safety and Quality Health Service's (NSQHS) – Standard 8 Recognising and Responding to Acute Deterioration.

These documents help practitioners to recognise patients whose condition is deteriorating and to respond to patient needs in an appropriate and timely way as essential components of safe and high-quality care.

The National Consensus Statement also identifies that recognition of, and response to, deterioration requires practitioners who are appropriately trained.

Medical radiation practitioners must be appropriately trained to support the Consensus Statement and as part of this they must know normal range values be able to identify abnormalities with the following physiological parameters:

- respiratory rate
- oxygen saturation
- heart rate
- blood pressure
- temperature, and
- level of consciousness.

Basic Life Support and Anaphylaxis management are critical enablers for recognising and responding to acute physiological deterioration

All medical radiation practitioners must be able to provide cardio pulmonary resuscitation (CPR) and use automatic devices (AED) To meet this capability registered practitioners must complete education or training with learning outcomes equivalent to *HLTAID010 Provide basic emergency life support*.

Medical radiation practitioners must be able to recognise the signs and symptoms of anaphylaxis and manage it safely and effectively. Practitioners are expected to administer suitable first-line treatments, such as adrenaline, within the limits of their scope of practice and in accordance with national clinical standards (ACSQHC Acute Anaphylaxis Clinical Care Standard) state or health department requirements and local protocols. Practitioners should confidently and correctly use adrenaline either as an ampoule or single use device (autoinjector, EpiPen etc). Practitioners must monitor and evaluate the patient's response, identify and manage adverse reactions, and ensure accurate documentation and communication with the healthcare team.

The Australasian Society of Clinical Immunology and Allergy (ASCIA) has published resources for anaphylaxis and provides online learning courses for health professions which is free of charge to practitioners in Australia and New Zealand. (See Anaphylaxis training for health professionals)

Taking appropriate and timely action is a key responsibility if a medical radiation practitioner identifies medically significant findings on an image and must be interpreted in the context of Australian Commission on Safety and Quality in Healthcare NSQHS Standard 6 Communicating for Safety. Information must be conveyed and documented in line with relevant guidelines. Medical radiation practitioners must ensure information is conveyed to, and understood by, the appropriate persons who may include the reporting practitioner, the requesting practitioner or other practitioners for the immediate and appropriate management of the patient. The patient and their family/carers should also be informed if further medical advice is required prior to them leaving the hospital/clinic. Communication between health practitioners about the clinical status of a patient should be recorded in accordance with relevant procedures.

If you see something, say something. Identifying urgent and unexpected findings includes recognising and applying knowledge of normal from abnormal imaging appearances and relating appearances to the patient's clinical history. If a medical radiation practitioner identifies something urgent or unexpected in an image, they must communicate this in a timely way to another health practitioner involved in the care of that patient. See Board policy Communicating for safety

Understanding legislation may include relevant state and territory and/or federal legislation about privacy of data, radiation safety and the differences across states and territories.

Clinical information management systems may include, but are not limited to, picture and archiving communication system (PACS), radiology information system (RIS), radiation oncology information systems (ROIS), risk management systems, radiation dose tracking systems, electronic medical records (EMR) or My Health Record (MHR). Medical radiation practitioners must understand the interaction between different systems, such as between RIS and PACS, as well as the interplay of these systems with emerging technologies which support clinical decision-making.

Managing clinical information **includes understanding and following patient and examination/treatment workflows** (enter, begin, complete), searching correctly (e.g. by examination, patient, modality, location and/or date etc.), and understanding and following the folder structures.

Responding to data errors and/or system failures includes troubleshooting and fixing errors where possible or reporting errors/failures to the systems administrator in a timely manner.

Using health data is a key capability for medical radiation practitioners. Understanding the various aspects of data is essential to using and applying that data through various means. It is closely connected with health informatics and the use of digital health systems

'Health data' refers to any information related to an individual's health status, healthcare history, treatment records, and healthcare services. It encompasses a broad range of data collected from various sources, including electronic health records (EHRs), medical imaging, laboratory results, wearable devices, patient-reported outcomes, and public health databases. In Australia, legislation exists at both the Commonwealth and State level that describes how health data or health information must be handled.

Digital health systems includes (but is not limited to): mobile health and applications (such as SMS reminders via mobile messaging, wellness apps, My Health app and Medicare Online), digital medicines including electronic prescribing and electronic medication charts, healthcare identifiers, electronic health records (including My Health Record), telehealth and telemedicine, wearable devices (such as fitness trackers and monitors), robotics and artificial intelligence, electronic referrals, access to private personal health data.

Artificial Intelligence – An AI system is a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment. Definition taken from *'Policy for the responsible use of AI in government.'* Commonwealth of Australia (Digital Transformation Agency) 2024 | Version 1801

Modalities and equipment may include, but are not limited to, 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, sample counters, superficial x-ray, linear accelerator, brachytherapy, ion chambers, planning systems, hybrid imaging systems, radiochemistry synthesis units, Technegas machines, survey meters and Geiger counters, personal dose meters, auto injectors, contrast injectors or radiation therapy treatment delivery systems.

Clinical history may include patient records, previous medical radiation practice services, and information collected from the patient during the procedure.

Patient capacity or behaviour may be influenced by pre-existing medical conditions, including physical, physiological or psychological, age, pregnancy, culture, English language skills, or psycho-social and socio-economic factors.

Selecting appropriate equipment and triaging patients must be undertaken with the application of the *Principle of Justice* to ensure the fairest distribution of care.

Knowledge of safe and effective use of medicines relevant to practice includes state and territory and/or federal legislation regarding the supply and administration of medicines. It also includes understanding how pathological conditions may affect the delivery of some medicines.

Safe and effective delivery of medicines is a fundamental component of professional and clinical practice. It requires practitioners to apply sound clinical judgement, evidence-based decision-making, and person-centred care to ensure medicines are used optimally to achieve the best health outcomes while minimising risk and harm.

The National Prescribing Competencies Framework (3rd edition, 2025) describes the knowledge, skills and professional behaviours required to prescribe and use medicines safely, effectively and professionally across all health professions. It emphasises person-centred care, cultural safety, shared decision-making, and the quality use of medicines (QUM)—a central pillar of the National Medicines Policy. Alignment with this framework supports consistent, high-quality practice across all stages of medicines management, including decision-making, use, monitoring, and review.

Safe and effective use of Computed Tomography (CT):

- **Diagnostic radiographers** are expected to perform a wide range of CT examinations, including imaging using contrast media in a range of haemodynamic phases (arterial, venous and delayed etc) (entry level competency does not include more complex vascular imaging such as brain perfusion imaging or cardiac angiography)
- **Radiation therapists and Nuclear medicine practitioners** may perform diagnostic CT imaging in addition to their role in using CT for physiological information. If Radiation therapists and/or nuclear medicine practitioners use contrast agents during a CT imaging procedure they must be able to safely and effectively use contrast media in line with Domain 1, Key capability 9.
- **Triaging patients for CT imaging –** Depending on the clinical purpose and the context of practice medical radiation practitioners may need to manage patient flow through CT. When appropriate, practitioners must effectively triage patients for whom CT imaging is requested according to their clinical need informed by national standards, organisational policies and local protocols

Capabilities for MRI, ultrasound, mammographic imaging, and/or angiography

(these capabilities apply if MRI, ultrasound, mammographic imaging or angiography are part of your practice)

The following key capabilities and enabling components cover the knowledge, skills and attributes needed by all diagnostic radiographers, nuclear medicine technologists and radiation therapists who use MRI, ultrasound, mammographic imaging and/or angiography as part of their practice. These key capabilities and enabling components are required to enable practitioners who use MRI, ultrasound, mammographic imaging and/or angiography to deliver efficient, effective, and culturally safe, person-centred care.

Key capabilities	Enabling components
1. Perform MRI.	a. Operate MRI systems safely and effectively. b. Apply knowledge of the principles of MRI physics and the protected environment to ensure patient and others' safety. c. Apply knowledge of cross-sectional anatomy, embryology, pathophysiology, haemodynamic and MRI appearances of normal and abnormal anatomy. d. Select equipment and imaging parameters relevant to the patient presentation and clinical indications and where appropriate, modify techniques or parameters to achieve optimal diagnostic outcomes. e. Collaborate in the design and evaluation of MRI protocols. f. Perform and evaluate MRI examinations and, where appropriate, modify the examination according to the MRI findings and clinical presentation. g. Process image data sets. h. Record urgent or unexpected findings and communicate in a timely manner
2. Perform ultrasound imaging.	a. Operate ultrasound imaging systems and parameters safely and effectively. b. Apply knowledge of the principles of ultrasound physics to minimise the likelihood of biological effects and identification of artefacts. c. Apply knowledge of cross-sectional anatomy, embryology, pathophysiology, haemodynamic and sonographic appearances of normal and abnormal anatomy. d. Select equipment and imaging parameters relevant to the patient presentation and clinical indications and where appropriate, modify techniques or parameters to achieve optimal diagnostic outcomes. e. Perform and evaluate ultrasound imaging and, where appropriate, extend or modify the examination according to the sonographic findings and clinical presentation. f. Document the real-time ultrasound examination and sonographer impressions and evaluate the findings. g. Record urgent or unexpected findings and communicate in a timely manner
3. Perform mammographic imaging.	a. Operate mammography systems safely and effectively b. Understand the different pathways and imaging options for breast imaging including screening and diagnostic mammography c. Apply knowledge of cross-sectional anatomy, embryology, pathophysiology, haemodynamic and radiographic appearances of normal and abnormal anatomy in mammography. d. Select equipment and imaging parameters relevant to the patient presentation and clinical indications and where appropriate, modify techniques or parameters to achieve optimal diagnostic outcomes. e. Prepare the patient for the examination, including positioning the patient for the best diagnostic outcome. f. Perform and evaluate mammographic images used in screening and diagnostic mammography. g. Perform image post-processing techniques. h. Assess images to ensure they meet defined image quality criteria for screening and diagnostic mammography, including assessment of exposure index, field of view and anatomical positioning. i. Record urgent or unexpected findings and communicate in a timely manner

Key capabilities	Enabling components
4. Perform angiography examinations in a range of settings.	a. Operate angiography systems safety and effectively in a range of settings. b. Effectively communicate and collaborate with the multi-professional team as the imaging request, patient history and previous medical images are reviewed, the patient is assessed to receive care and the procedure is planned. c. Prepare the patient for the examination, including positioning the patient for the best diagnostic outcome. d. Apply knowledge of equipment geometry for procedures. e. Apply knowledge of imaging acquisition modes and radiation dose rates. f. Perform image post-processing techniques. g. Prepare the patient and delivery systems with the appropriate contrast agent using aseptic techniques. h. Apply knowledge of medical equipment and prostheses used in the angiography setting. i. Collaborate in the design and evaluation of and angiography protocols.

Explanatory Notes

MRI:

MRI includes contrast-enhanced studies and the safe and appropriate selection of MRI contrast agents for the patient presentation. It also includes safely managing the use of contrast agents and recognising and responding to adverse reactions.

MRI safety includes but is not limited to:

- Maintaining the integrity of MRI safety zones.
- Applying principles of electro-magnetic forces and fields (static and gradient and radiofrequency).
- Minimising the bioeffects of magnetic fields (including tissue heating and peripheral nerve stimulation).
- Understanding exposure limits (including specific absorption rates).
- Assessing and managing risks associated with devices/implants/projectiles, and acoustic risks.
- Implementing emergency procedures in the event of quench or the distressed and/or deteriorating patient.

Ultrasound:

Ultrasound imaging systems must include 2D, Doppler and may include contrast and 3D, where appropriate.

Ultrasound physics includes transducer design and operation, identification of artefacts and understanding of the biological effects of ultrasound.

Documenting the real-time examination must follow organisational protocols and still images/cine loops must accurately represent any pathology present or absent.

Angiography:

Range of settings may include, but are not limited to, an imaging department, emergency department, operating theatre, intensive care unit, cardiac catheterisation lab and an angiography suite with both fixed and mobile equipment (both within and externally to the hospital setting).

Knowledge of equipment geometry for the procedure may include, but is not limited to, beam-receptor angulation, source-image distance, rotational imaging, anti-scatter equipment (physical and digital) and radiation protective shielding.

Knowledge of radiation dose delivery may include, but is not limited to, radiation dose factors, x-ray beam collimation and filtration, geometric and digital magnification.

Delivery systems may include, but are not limited to, intra-arterial, intravenous, oral, and hepatobiliary.

Medical equipment used in angiography may include, but is not limited to, catheters, guide wires, stents, vascular occlusion devices, vascular clips and filters, and prostheses.

Domain 1A: Diagnostic Radiographer

This domain covers the additional knowledge, skills and attributes a diagnostic radiographer needs in order to practise independently. Diagnostic radiographers are autonomous, highly skilled health practitioners who produce, manage and oversee high-quality medical imaging and perform diagnostic procedures often using ionising radiation. They work collaboratively in multi-professional teams, contributing to learning, education, and interprofessional practice to ensure safe, effective, and patient-centred care.

Key capabilities	Enabling components
1. Perform projection radiography examinations in a range of settings.	a. Operate projection radiography systems safely and effectively in a range of settings. b. Prepare the patient for the examination, including positioning the patient for the best diagnostic outcome. c. Use standard radiographic projections and exposure factors for the patient's body area being examined and, when appropriate, modify them to consider patient presentation, clinical indications and mechanisms of injury. d. Select appropriate equipment, receptor type and set equipment geometry for the examination. e. Perform image post-processing techniques. f. Critically evaluate images against radiographic criteria, including assessment of exposure index, field of view and anatomical positioning. g. Record urgent or unexpected findings and communicate in a timely manner h. Collaborate in the design and evaluation of projection radiography protocols.
2. Perform fluoroscopy examinations in a range of settings.	a. Operate fluoroscopy systems safely and effectively in a range of settings, including in the operating theatre setting. b. Effectively communicate and collaborate with the multi-professional team as the imaging request, patient history and previous medical images are reviewed, the patient is assessed to receive care, and the procedure is planned. c. Prepare the patient for the examination, including positioning the patient for the best diagnostic outcome. d. Apply knowledge of equipment geometry for procedures. e. Apply knowledge of imaging acquisition modes and radiation dose rates. f. Perform image post-processing techniques. g. Prepare the patient and delivery systems with the appropriate contrast media using aseptic techniques. h. Apply knowledge of medical equipment and prostheses used in the operating theatre setting. i. Collaborate in the design and evaluation of fluoroscopy protocols.

Domain 1A: Explanatory Notes

Projection Radiography examinations may include, but are not limited to, appendicular and axial skeleton and associated soft tissues, chest and abdomen performed on patients from across the life span using fixed and mobile projection radiography equipment. It may also include bone mineral densitometry, mammography, orthopantomography and dental imaging.

Range of settings for radiography examinations may include, but are not limited to, the imaging department or private practice, emergency department, operating theatre, intensive care unit, diagnostic and screening mammography facility or use of mobile systems.

Appropriate equipment parameter settings for radiography examinations include, but are not limited to, source-image distance, x-ray scatter reducing devices, vertical or horizontal configuration, fixed or free receptor configurations, anatomical and directive radio-opaque markers, x-ray beam collimation and filtration.

Range of settings for fluoroscopy may include, but are not limited to, an imaging department, emergency department, operating theatre or an intensive care unit.

Working safely and effectively in the operating theatre includes ensuring that appropriate aseptic techniques are used to maintain a sterile field.

Knowledge of equipment geometry for fluoroscopy may include, but is not limited to, beam-receptor angulation, source-image distance, rotational imaging, anti-scatter equipment (physical and digital) and radiation protective shielding.

Knowledge of radiation dose delivery for fluoroscopy may include, but is not limited to, radiation dose factors, image frame rate for fluoroscopy and image acquisition, x-ray beam collimation and filtration, geometric and digital magnification, and fluoroscopic road-mapping.

Delivery systems for fluoroscopy may include, but are not limited to, intra-arterial, intravenous, oral, and hepatobiliary.

Domain 1B: Nuclear Medicine Technologist

This domain covers the additional knowledge, skills and attributes a nuclear medicine technologist needs in order to practise independently. Nuclear medicine scientists and technologists are autonomous, highly skilled health practitioners who prepare, deliver, image, and quantify diagnostic radiopharmaceuticals to demonstrate organ and molecular function, and administer therapeutic radiopharmaceuticals to treat disease. They work collaboratively in multi-professional teams, contributing to learning, education, and interprofessional practice to ensure safe, effective, and patient-centred care.

Key capabilities	Enabling components
1. Prepare and assess the purity of radiopharmaceuticals.	a. Perform the elution and quality control of the radioisotope generator. b. Understand the theoretical concepts that are employed production of radiopharmaceuticals with appropriate manufacturing and quality control procedures. c. Assay the eluate and prepare radiopharmaceuticals ensuring critical procedure features are observed, such as correct volume and radioactivity. d. Perform quality control on radiopharmaceuticals and assess for patient use.
2. Perform nuclear medicine examinations and therapies.	a. Calculate the dose and decay of radiopharmaceuticals used in examinations and therapies. b. Recognise the difference between diagnostic and therapeutic doses, as it affects the patient, health practitioner and the public. c. Deliver appropriate dosage of radiopharmaceutical delivery systems and safe aseptic techniques for each patient. d. Use appropriate radiopharmaceutical delivery systems. e. Perform planar, Single-Photon Emission Computed Tomography (SPECT/CT) and PET/CT, and other emerging PET studies, including positioning the patient for the best diagnostic outcome. f. Process data image sets, including multi-planar reformats and volume imaging. g. Determine whether the biodistribution of radiopharmaceuticals is normal, altered or unexpected. h. Apply the principles underpinning nuclear medicine therapies to practice. i. Prepare the patient and delivery systems for nuclear medicine radiopharmaceutical therapies. j. Record urgent or unexpected findings and communicate in a timely manner
3. Perform in vivo and in vitro laboratory procedures.	a. Perform safe aseptic blood labelling procedures. b. Perform in vivo laboratory procedures. c. Implement appropriate methods to determine if results of laboratory procedures are normal, altered or unexpected.
4. Support the provision of theranostics as part of a multi-professional team.	a. Apply the theoretical principles which are employed for theranostics in nuclear medicine, including knowledge of radiopharmacology, imaging instrumentation, and radiation protection. b. Support patient selection and preparation and understand the indications and contraindications for theranostics use. c. Understand principles of radiopharmaceuticals preparations and measure their activity pre- and post-treatment. d. Apply knowledge of radiopharmaceutical therapy administration, and perform associated imaging requirements. e. Supervise patients throughout the treatment process. Identify and assist in managing instances of adverse events. f. Assist knowledge of dosimetry estimations, where required. g. Understand and provide advice on patient release following outpatient treatments as required.

Domain 1B: Explanatory Notes

PET radiopharmaceuticals include, but are not limited to, Gallium-68 and Fluorine-18 based radiopharmaceuticals.

Radiopharmaceuticals for target therapy, such as Alpha-emitters, Beta-emitters and Gamma-emitters, include, but are not limited to Lutenium-177 (177Lu), Yttrium-90 (Y90) and Actinium-225 (225AC), Lead-212 (212Pb).

Quality control procedures for radiopharmaceuticals include, but are not limited to, pipetting and fractionating of radioactive compounds and using High-Performance Liquid Chromatography (HPLC) and Thin-Layer Chromatography (TLC) systems.

Delivery systems for nuclear medicine examinations and therapies may include, but are not limited to, intra-arterial, intravenous, oral, subcutaneous and inhalation.

Planar, SPECT/CT and PET/CT and other emerging PET Studies may include, but are not limited to, studies performed for oncologic (diagnostic and therapeutic purposes) cardiac, renal, endocrine and neurologic conditions. .

Laboratory procedures must be understood by nuclear medicine technologists and may include the use of sample counters, such as well counters, use of survey meters and Geiger counters, operation of centrifuges, and use of fume hoods.

Theranostic tasks for nuclear medicine technologists must be performed in collaboration with a theranostic specialist, multi-professional team and in accordance with a standard operating procedures.

Domain 1C: Radiation Therapist

This domain covers the additional knowledge, skills and attributes a radiation therapist needs in order to practise independently. Radiation therapists are responsible for planning and delivering radiation treatment, primarily for people diagnosed with cancer. Radiation therapists are autonomous, highly skilled health practitioners who create and evaluate images for the localisation, planning, and delivery of radiation treatment in accordance with the radiation treatment prescription. They provide comprehensive patient care before, during, and after treatment, and work collaboratively in multi-professional teams, contributing to learning, education, and interprofessional practice to ensure safe, effective, and patient-centred care.

Key capabilities	Enabling components
1. Use equipment and perform techniques to ensure reproducibility of the patient's position for radiation therapy.	a. Identify and apply appropriate equipment and techniques to ensure accurate and reproducible localisation, pre-treatment imaging, planning and treatment, for the patient's diagnosis and condition. b. Fabricate or adapt suitable stabilisation and ancillary equipment as needed.
2. Perform localisation and pre-treatment imaging.	a. Select imaging modalities suited to individual patient presentations and related planning procedures. b. Perform localisation for a range of cancer sites using other modalities. c. Apply knowledge of a range of imaging modalities for use in localisation.
3. Perform treatment planning.	a. Apply the principles of radiation physics, dosimetry and radiobiology to treatment planning. b. Apply knowledge of tumour and target volumes, and normal tissue volumes to treatment planning. c. Apply knowledge of cross-sectional anatomy, physiology and oncology to treatment planning. d. Create clinically acceptable treatment plans. e. Evaluate treatment plans to ensure they are clinically acceptable and safe.
4. Perform radiation therapy treatment according to approved radiation therapy prescriptions and treatment plans.	a. Operate imaging equipment and radiation therapy treatment systems safely and effectively. b. Operate treatment delivery record and verification systems safely and effectively. c. Implement the radiation therapy treatment plans for a range of treatment techniques. d. Apply knowledge of radical and palliative treatment doses and acceptable dose limits to critical structures during implementation of treatment plans. e. Evaluate treatment verification images and modify the patient's treatment delivery according to local protocols. f. Identify treatment toxicities and side effects and make appropriate referrals for their management g. Record urgent or unexpected findings and communicate in a timely manner

Domain 1C: Explanatory Notes

Treatment planning may include, but is not limited to, imaging and treatment modalities used, including CT, MRI, PET and may include brachytherapy, superficial radiation therapy, radiosurgery/stereotactic radiation therapy, paediatric radiation therapy, total body irradiation, and proton beam therapy.

Treatment plans may include, but are not limited to, 2D, 3D and 4D, conformal radiation therapy (CRT), intensity-modulated radiation therapy (IMRT) and may include volumetric-modulated arc therapy (VMAT).

Evaluating radiation therapy treatment plans may include, but are not limited to, radiation therapists evaluating and analysing treatment plans that they create, as well as treatment plans created by other practitioners.

Note: Proton therapy – at the time of drafting proton therapy is gaining greater usage in clinical practice and may potentially evolve into common practice in Australia during the lifespan of these updated Professional capabilities. Registered practitioners should consider engaging in professional development and training as proton therapy becomes a relevant to their practice. Education providers should also monitor and consider introducing learning outcomes and teaching content into programs. Where it is feasible and viable to do so education providers should consider Work Integrated Learning (WIL) assessments that enable graduates to include proton therapy in their practice.

Domain 2: Professional and Ethical Practitioner

This domain covers medical radiation practitioner's responsibility and commitment to the health and wellbeing of individual patients and to the community through professional and ethical practice in the current medico-legal framework, professional standards of behaviour, maintenance of personal health, and accountability to the profession and the public. It also addresses medical radiation practitioners' responsibility for ensuring that patient confidentiality and privacy is maintained at all times, while recognising their own role as a patient advocate.

Key capabilities in this domain are common to all three divisions of the register of medical radiation practitioners.

Key capabilities	Enabling components
1. Practise in an ethical and professional manner, consistent with relevant legislation and regulatory requirements.	a. Comply with legal, regulatory and professional requirements, responsibilities and guidelines, including but not limited to: – All relevant Commonwealth, state and territory legislation. – All relevant codes, standards and guidelines issued by the Medical Radiation Practice Board of Australia, including the *Code of conduct*[13]. – Relevant national safety and quality standards for the health and disability sectors, including those published by the Australian Commission on Safety and Quality in Health Care and the National Disability Insurance Scheme Quality and Safeguards Commission. – Safe and effective use of scheduled medicines. – Restrictions on importing and/or exporting and using medicines and medical devices as regulated by the Therapeutic Goods Administration. – Data privacy and the ownership, storage, retention, and destruction of patient records and other practice documents. b. Respect patient confidentiality, privacy, and dignity. c. Provide accurate information to patients and their families/carers about their care and implement appropriate methods for obtaining, and facilitating the withdrawal of, informed consent. d. Ensure patients and their families/carers are aware of the likelihood and degree of risk inherent to proposed examinations or treatments for which the medical radiation practitioner is responsible. e. Apply knowledge and understanding of relevant systems to practice, including the Australian health and social care systems. f. Manage own personal mental and physical health to ensure fitness to practise safely at all times, including recognising the impact of stress and fatigue on physical and mental health. g. Understand mandatory reporting obligations outlined in the *Guidelines: Mandatory notifications about registered health practitioners*[14] and recognise the grounds for a voluntary notification. h. Exercise appropriate levels of autonomy and professional judgement in a variety of medical radiation practice settings. i. Show respect and collegiality towards other health practitioners and other members of multi-professional health care teams. j. Identify and manage own conflicts of interest, including personal, professional and financial interests. k. Apply the Principles of biomedical ethics and recognise and respond appropriately to ethical issues encountered in practice. l. Understand the impact of resourcing health services and use health resources safely and sustainably. m. Understand the role of health literacy as a determinant of health. Promote and enable the health literacy of patients, their families and carers.

13 Medical Radiation Practice Board of Australia (2022). Code of conduct. https://www.medicalradiationpracticeboard.gov.au/Registration-Standards/Code-of-conduct.aspx

14 Ahpra & National Boards (2020). Guidelines: Mandatory notifications about registered health practitioners. Australian Health Practitioner Regulation Agency – Making a mandatory notification (ahpra.gov.au)

Key capabilities	Enabling components
2. Treat each patient with respect, dignity, and care.	a. Recognise and evaluate the socio-cultural factors that may influence patient attitudes and responses to medical radiation services. b. Recognise and respect Aboriginal and Torres Strait Islander Peoples' ways of knowing, being and doing in the context of history, culture and diversity and affirm and protect these factors through ongoing learning in health practice. c. Apply the principles of cultural competence and culturally safe care to practice. d. Identify, recognise and respect appropriate boundaries between patients and health professionals. e. Involve patients and their families or carers in all aspects of their care and associated decision-making.
3. Assume responsibility and take accountability for professional decisions.	a. Recognise and work within the limits of individual competence and scope of practice. b. Make appropriate professional decisions about the care of patients and demonstrate commitment to the health and wellbeing of individual patients through professional standards of behaviour. c. Reflect on practice and recognise and respond appropriately to unsafe or unprofessional practice. d. Apply relevant clinical protocols and organisational policies and guidelines to practice, in accordance with professional standards.
4. Advocate on behalf of the patient when appropriate.	a. Support and promote the rights and interests of patients and support them to represent their own interests, when appropriate. b. Reflect on socio-cultural factors and respond to the rights and cultural needs of the patient and relevant others. c. Recognise when it may be appropriate to intervene on behalf of the patient. d. Recognise when an alternative patient pathway may be more appropriate and make recommendations to other practitioners. e. Where relevant, advocate for adequate resources to achieve positive outcomes for patients.

Domain 2: Explanatory Notes

Legal responsibilities must include, but are not limited to, responsibilities contained in relevant state and territory and/or federal legislation and regulations, specific responsibilities to maintain confidentiality, obtain informed consent and exercise duty of care.

Principles of bio-medical ethics are autonomy, non-maleficence, beneficence and justice (see Beauchamp and Childress[15]).

Key elements of fitness to practise must include competence and 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 the practice.

Reporting obligations must include making a mandatory notification when needed about impairment, intoxication while practising, significant departure from accepted professional standards, and sexual misconduct and when to notify the Australian Health Practitioner Regulation Agency (Ahpra) about certain notifiable events.

Relevant information provided to patient may include explaining the implications of a procedure, such as contrast/radiopharmaceutical administration, and explaining the considerations for people at risk, such as children, pregnant patients and their fetus and breastfeeding patients.

Relevant aspects of the Australian healthcare system must include, but are not limited to, knowledge of service provision arrangements, the structure and role of Medicare and billing arrangements.

Socio-cultural factors may include, but are not limited to, cultural and linguistic diversity, age, gender, disability, religion, socio-economic, geographic locations and identifying as Aboriginal and/or Torres Strait Islander Peoples.

15 Beauchamp, Tom L & Childress, James F (2019) *"Principles of Biomedical Ethics"* 8th edition. Oxford University Press ISBN: 9780190640873

Professional standards of behaviour include behaviour that is non-discriminatory, empathetic and respects socio-cultural differences.

Cultural competence/ cultural capability is a set of congruent behaviours, attitudes, and policies that come together in a system, agency, or among professionals and enable that system, agency, or those professionals to work effectively in cross-cultural situations. The word 'culture' is used because it implies the integrated pattern of human behaviour that includes thoughts, communications, actions, customs, beliefs, values and institutions of a racial, ethnic, religious or social group. The word 'competence' is used because it implies having the capacity to function effectively.

A culturally competent system of care acknowledges and incorporates – at all levels:

- the importance of culture
- the assessment of cross-cultural relations
- vigilance towards the dynamics that result from cultural differences
- the expansion of cultural knowledge
- the adaption of services to meet culturally unique needs.

Medical radiation practitioners must be able to work with people from various cultures that may differ from their own. The workforce should foster a positive, inclusive, and culturally safe work environment by practising in a way that is culturally safe and supports the rights, dignity, and safety of others.

The Medical Radiation Practice Board acknowledges the importance of cultural competence in Australia's multicultural society to support 'cultural safety' in the delivery of care. Cultural safety is about creating an environment that is safe (spiritually, socially, emotionally and physically) for Aboriginal and Torres Strait Islander Peoples and culturally and linguistically diverse peoples.

Culturally safe care recognises the social, economic, cultural, historical, and behavioural factors that influence the health of individuals, communities, and populations. It is defined by respect for the diverse cultures, beliefs, gender identities, sexualities, and experiences of people, including patients, their families, and carers.

Cultural safety for Aboriginal and Torres Strait Islander Peoples is defined in the National Schemes Aboriginal and Torres Strait Islander Health and Cultural Safety Strategy 2020–2025 as

> *Cultural safety is determined by Aboriginal and Torres Strait Islander individuals, families and communities.*
>
> *Culturally safe practice is the ongoing critical reflection of health practitioner knowledge, skills, attitudes, practising behaviours and power differentials in delivering safe, accessible and responsive healthcare free of racism.*

Aboriginal and Torres Strait Islander Peoples' ways of knowing relate to entities of people, land, animals, plants, skies, waterways and climate. Aboriginal and Torres Strait Islander Peoples' ways of being is a concept about how to be respectful, responsible and accountable in relation to self and entities. Aboriginal and Torres Strait Islander Peoples' ways of doing is the lived expression of relatedness[16].

Family, domestic, and sexual violence

Family, domestic, and sexual violence is a major health and welfare issue in Australia, and can have a serious effect on people, families, and communities. Family, domestic, and sexual violence refers to any behaviour that occurs in families or intimate relationships that causes physical, sexual, or psychological, harm[17].

Health practitioners have an important role to play in addressing family, domestic, and sexual violence in the community, as they are often the first point of contact for victim survivors. It is important that medical radiation practitioners are able to identify and respond to suspicions and disclosures of violence in the clinical setting.

An understanding of the interplay and influences of gender, power, control, and race, enhanced by an intersectional perspective, is important to formulating effective responses to family, domestic, and sexual violence. Adopting an intersectional perspective recognises that the intersection of various identity aspects, such as gender, class, ethnicity, cultural background, religion, disability, and sexual orientation, can increase the risk of violence and discrimination for individuals.

Being aware of the risks and indicators of family, domestic, and sexual violence, as well as relevant local escalation and referral pathways, allows medical radiation practitioners to be capable of effectively responding to patients who have been impacted by family, domestic, and sexual violence.

16 Martin K and Mirraboopa B (2003) 'Ways of knowing, being and doing: A theoretical framework and methods for indigenous and indigenist research'. Journal of Australian Studies. 27(76):203–214.

17 Department of Health and Aged Care (2024). About family, domestic and sexual violence. About family, domestic and sexual violence | Australian Government Department of Health and Aged Care

Recommendations on alternative patient pathways are made when it is recognised that the planned patient pathway may not provide the optimal outcome for the patient.

Medical radiation practitioners must:

- provide patient-centred care
- advocate for the patient's equitable access to effective examinations/treatment, other health professionals and services that address their needs
- acknowledge that access broadly includes availability, affordability, acceptability and appropriateness.

Promoting and enabling health literacy Health literacy is critical to empowering patients, carers, families and the community to make decisions about personal health, and in enabling their engagement in the health environment to address determinants of health. It includes the ability to think critically about, as well as the ability to interact and express personal and societal needs for promoting health. Importantly, differences in health literacy exist within and across population groups and settings which can be further exacerbated by digital determinants of health and commercial determinants of health.

See World Health Organisation Health Literacy webpage https://www.who.int/news-room/fact-sheets/detail/health-literacy

Domain 3: Communicator and Collaborator

This domain covers medical radiation practitioner's responsibility to communicate clearly, effectively and appropriately with patients and their families or carers. It requires practitioners to support health literacy in others by using plain language, providing accessible materials and encouraging patients, families and others to actively participate in their healthcare. It also addresses practitioners' responsibility to work effectively with other health practitioners to deliver efficient, effective, and culturally safe, person-centred care.

Key capabilities in this domain are common to all three divisions of the register of medical radiation practitioners.

Key capabilities	Enabling components
1. Communicate clearly, effectively, empathetically and appropriately with the patient and their family or carers.	a. Engage in culturally appropriate, safe, empathetic, and sensitive communication that facilitates trust and the building of respectful relationships with • Aboriginal and Torres Strait Islander Peoples and • people from culturally and linguistically diverse backgrounds b. Establish rapport with the patient and/or their families or carers to gain understanding of their issues and perspectives and communicate in ways that engender trust and confidence. c. Communicate effectively with the patient (and, at times, beyond the patient) to collect and convey information about the proposed examination/treatment. Identify likely communication barriers specific to individual patients and/or family/carers and implement strategies to avoid or overcome them. d. Listen effectivqely to the patient and their family or carers and respond appropriately to verbal and non-verbal communication. e. Convey knowledge and procedural information in ways that create trust and confidence and respects the patient's confidentiality, privacy and dignity. f. Provide an opportunity for the patient to explore the purpose of the proposed examination/treatment, the methods used and the typical patient experience. g. Explain the purpose, risks, and benefits of the proposed examination/treatment, and obtain informed consent to proceed. Continually communicate with the patient to ensure ongoing consent throughout the examination/treatment. h. Recognise patients for whom English may not be a first language, and make provisions to use qualified language interpreters, cultural interpreters, or cultural care coordinators to facilitate effective communication where needed.
2. Communicate and collaborate with members of the patient's healthcare team and relevant others.	a. Establish and maintain effective and respectful working relationships with members of the patient's healthcare team. b. Understand, acknowledge and respect the roles and responsibilities of members of the patient's healthcare team, and other service providers, and work effectively and collaboratively with them in the interests of shared patient care. c. Use verbal and written communication to share information with others in the patient's healthcare team, following accepted protocols and procedures to clarify responsibilities and transfer information in a timely manner. d. Make recommendations to other members of the healthcare team about the suitability and application of the proposed medical radiation examination/ treatment, including any limitations, when appropriate. e. Effectively and appropriately use digital tools to communicate and collaborate with the patient, members of the patient's healthcare team and relevant others.
3. Effectively communicate and collaborate with assistants, students, and other supervised workers.	a. Use appropriate skills, training, strategies, and knowledge to effectively mentor, supervise and delegate tasks to assistants, students, and other supervised workers. b. Proactively recognise opportunities to educate assistants, students, and other supervised workers in the delivery of efficient, effective, and safe person-centred care. c. Deliver timely feedback (verbal and written) to assistants, students, supervised workers and relevant others, including education providers, on their performance. d. Engage with assistants, students, and other supervised workers to support their professional development, including engaging with self-directed learning and critical reflection. For students, this may include supporting their work readiness, in preparation for entering the workforce.

Key capabilities	Enabling components
4. Reflect on one's own culture and how it influences perceptions and interactions with others from different cultures.	a. Understand the impact of systemic racism and recognise the influence of one's own cultural identify on perceptions of, and interactions with, – Aboriginal and Torres Strait Islander Peoples – and people from other culturally and linguistically diverse backgrounds. b. Recognise how the cultural diversity of the patient's healthcare team can influence perceptions of, and interactions with, the patient and other members of the healthcare team. c. Recognise different forms of cultural bias and associated stereotypes that impact on the health of Aboriginal and Torres Strait Islander Peoples, and practise in a culturally sensitive and inclusive manner. This includes people from other culturally and linguistically diverse backgrounds. d. Recognise the role of history and relationships between Aboriginal and Torres Strait Islander Peoples and non-Indigenous Australian society and how this has affected the inequitable distribution of privileges.

Domain 3: Explanatory Notes

Communication barriers may arise because the medical radiation practitioner's own culture and experience affect their interpersonal style, or because of the patient's or family's/carer's culture and experience. The patient's or family's/carer's capacity to understand may be influenced by English language skills, health literacy, age and health status.

Communication beyond the patient may include with family, significant others, carers, interpreters, legal guardians and medical advocates. Communication beyond the patient should be undertaken with the patient's consent, unless they are incapacitated, to be compliant with the *Commonwealth Privacy Act*.

Effective communication includes active listening, use of appropriate language and detail, use of appropriate verbal and non-verbal cues and confirming that the other person has understood.

Informed consent is a person's voluntary decision about healthcare that is made with knowledge and understanding of the benefits and risks involved (for further guidance, see the NSQHS Standards).

The patient's healthcare team includes the range of health and support professionals who may be involved in the patient's care. This could include, for example, the referring practitioners, specialists, nursing team members, care coordinators, and other medical radiation practitioners.

Communicating and collaborating with other health practitioners includes accepting referrals from other practitioners, referring patients to other practitioners and/or engaging in inter-professional collaborative practice, as part of a multi-professional team. When referring patients or accepting referred patients, practitioners are expected to communicate verbally and/or in writing.

Assistant workforce encompasses a range of professionals who support elements of medical radiation practice but are not the primary practitioners.

Supervised workforce refers to professionals who perform elements of medical radiation practice, including imaging, under the supervision of a medical radiation practitioner.

Making recommendations about the suitability and application of procedures requires understanding of the relative radiation risks and benefits to patients of each examination/treatment used and effective collaboration with other members of the healthcare team. More experienced medical radiation practitioners may be expected to direct other members of the healthcare team, when appropriate.

Communication methods must consider the information needs of the patient, family/carers and other members of the patient's care team and may include the medical radiation practitioner using medical terminology and applying knowledge of departmental/practice protocols.

Domain 4: Lifelong Learner

This domain covers medical radiation practitioner's responsibility to engage in evidence-informed 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 to deliver efficient, effective, and culturally safe, person-centred care

Key capabilities in this domain are common to all three divisions of the register of medical radiation practitioners.

Key capabilities	Enabling components
1. Manage issues and challenges by applying critical thinking, reflective practice and evidence-based practice.	a. Identify the issue, challenge or uncertainty and the information that is needed to respond. b. Find, appraise, analyse, interpret, and implement best available research evidence to inform clinical reasoning and professional decision-making. c. Integrate best available research evidence with other evidence sources, including clinical expertise, clinical context and patient values, in the provision of care. d. Regularly review existing practice – reflecting on professional experiences or challenges – and integrate knowledge and findings into practice. e. Identify and engage in opportunities to contribute to the development of new knowledge through research and enquiry.
2. Identify ongoing professional learning needs and engage in professional learning and development opportunities.	a. Comply with legal and professional responsibilities to undertake relevant continuing professional development and ongoing cultural learning. b. Critically reflect on own strengths and limitations to identify learning opportunities to improve and adapt professional practice. c. Seek input and feedback from peers, supervisors and others to confirm development areas. d. Plan and implement steps to address professional learning and development needs and proactively recognise opportunities to educate self and peers.
3. Peer learning and development	a. Identify learning needs and plan for effective learning and development b. Understand and apply the principles of cognitive skill development and adult learning principles in planning and delivering learning and assessment. c. Understand competence, performance and different types of assessment. d. Identify issues for learners who need support e. Understand challenges and strategies for group learning f. Understand the role and the attributes of an effective clinical educator g. Deliver effective clinical teaching and assessment aligned to learning outcomes h. Provide effective feedback and critique to encourage reflection, learning and growth
4. Engage in peer development and mentorship.	a. Actively seek and engage in opportunities to mentor and support peer development b. Share knowledge, experiences and learnings with other practitioners involved in patient care to enhance health outcomes. c. Identify and support opportunities for interprofessional education d. Where relevant, participate in the teaching, learning and assessment of students, medical radiation practice assistants, and other supervised staff in the clinical setting. e. Where relevant, use appropriate development or mentoring strategies to support students, other medical radiation practitioners, medical radiation practice assistants, and other health practitioners in the clinical setting.

Domain 4: Explanatory Notes

Challenges or questions are not limited to clinical challenges or questions. Medical radiation practitioners are expected to identify and seek a solution for any challenge or question they encounter in professional practice.

Best available research evidence is credible information from valid and clinically relevant research conducted using sound methodology.

Evidence-based practice is an approach to care that integrates the best available research evidence with clinical expertise and patient values into clinical and professional-decision making practises.

Recognise opportunities to contribute to the development of new knowledge requires a practitioner to have a basic understanding of research design, methodology, analysis, review and publication steps in the research pathway.

Professional responsibilities to undertake continuing professional development include, but are not limited to, compliance with the Board's continuing professional development registration standard[18]. Professional development may be given by the professional community and the broader healthcare network/practice.

Cognitive skill development is framed around cognitive learning theories where problem-based learning is the foundational concept – i.e. attempting to solve the problem before being taught the solution. Applying cognitive learning theory to adult education typically involves active learning (hands-on simulations and problem solving), organising learning into manageable chunks, grouping related concepts, feedback and reflective self-assessment.

Peer learning and development refers to the skills and knowledge that underpin effective clinical education – teaching, learning and assessing of students, assistant practitioners or supervised practitioners. Accredited programs of study must include curriculum elements and learning outcomes that enable graduates to plan learning, support learners, deliver teaching in the clinical environment, understand and apply different models of assessment, providing assessment feedback and critique that encourages reflection and growth in the learner.

Mentoring typically involves a more experienced individual (the mentor) supporting a less experienced individual (the mentee) in their growth and development. It is a collaborative and reciprocal relationship where knowledge and experiences provide guidance and perspective.

18 The Medical Radiation Practice Board of Australia *Registration Standard: Continuing Professional Development* is available from www.medicalradiationpracticeboard.gov.au/Registration-Standards. Accessed 30 August 2024

Domain 5: Safety, Quality and Risk Management Practitioner

This domain covers medical radiation practitioner's responsibility to protect patients and others from harm within the healthcare environment. Medical radiation practitioners are directly responsible for managing and responding to the risks in both healthcare and medical radiation practice. This includes the radiation dose to patients. It also addresses medical radiation practitioner's responsibility for safety, quality and managing risk to deliver efficient, effective, and culturally safe, person-centred care

Key capabilities in this domain are common to all three divisions of the register of medical radiation practitioners.

Key capabilities	Enabling components
1. Perform and provide safe radiation practice.	a. Comply with relevant radiation safety legislation and practice in accordance with relevant radiation safety guidelines. b. Apply knowledge of radiobiology and medical radiation physics to examinations/treatments. c. Apply knowledge of radiobiology and radiation dose adjustment to deliver safe and effective patient outcomes. d. Review the referral and associated examinations/treatment prescription to ensure appropriate justification, limitation and optimisation. e. Identify radiation risks and implement effective and appropriate risk management systems and procedures.
2. Protect and enhance patient safety.	a. Follow patient identification procedures to confirm the correct match of the patient with the intended examination/treatment and the correct anatomical site. b. Review, communicate, record and manage patient information accurately, consistent with protocols, procedures, and legislative requirements for maintaining patient records. c. Identify and manage risks associated with patient transfer. d. Identify and manage risk of infection, including during aseptic procedures. e. Where appropriate, contribute to the improvement of policies and procedures for safe practice in the workplace and apply relevant quality frameworks to practice. f. Recognise and raise concerns about other health practitioners and registered students where their practice compromises patient safety and report concern where there are sufficient grounds to do so, in line with mandatory reporting requirements. g. Adhere to safety protocols and requirements specific to modalities within scope of practice, including the use and administration of medicines, ensuring the protection of patients and other health practitioners in line with relevant legislative requirements.
3. Implement quality assurance processes for imaging or treating patients.	a. Check and confirm that all equipment is in good order and operating within established standards and specifications. b. Follow protocols to record details of all routine equipment checks. c. Identify and take appropriate action to correct sub-optimal condition or operation of all equipment. d. Apply an understanding of the principles of continuous quality improvement to practice. e. Apply an understanding of the principles of clinical audits, reviews and service evaluation, including quality control and quality assurance. f. Follow protocols to record and report non-conformance of all equipment.

Key capabilities	Enabling components
4. Maintain safety of the workplace and associated environments.	a. Identify and, where appropriate, implement strategies to minimise safety hazards, ergonomic risks and other modality-specific risks in the workplace. b. Apply safe practice and manual handling techniques and ensure the appropriate identification, management, and maintenance of equipment to uphold a safe workplace and environment for both patients and staff. c. Respond to and report on all incidents, including radiation and radioactivity incidents and near misses, in a timely and appropriate manner, in accordance with protocols and procedures. d. Manage the environmental risks of manufactured radiation and radioactivity. e. Identify, confirm, and implement methods of radiation management. f. Use safe and appropriate methods for managing manufactured radiation sources in accordance with relevant legislation, including using appropriate personal protective clothing and equipment and complying with shielding requirements. g. Use safe and appropriate methods for storing and disposing of radioactive material and identify and minimise occupancy risks about proximity of radiation and radioactive storage, in accordance with relevant legislation. h. Provide information on radiation-related hazards and control measures to others in the workplace.

Domain 5: Explanatory Notes

Radiation safety legislation and guidelines may include state and territory or federal radiation safety legislation and guidelines, and the differences across the states and territories including, but not limited to, radiation management plans.

Radiation dose adjustments should be made based on evidence or advice received from a qualified practice expert, such as a radiation safety office.

Risk management includes an understanding of relevant quality assurance frameworks and their application to practice.

Justification involves assessing whether more good than harm results from a radiation practice.

Limitation involves setting radiation dose limits, or imposing other measures, so that the health risks to any person exposed to radiation are within an acceptable range having regard to safety, image quality and treatment effectiveness.

Optimisation involves minimising health risks to any person, with the broad objective that the degree of exposure to radiation, number of people exposed, and likelihood of exposure be kept as low as reasonably achievable, while considering economic and social factors.

Patient identification procedures must use at least three recognised patient identifiers and may include procedures for transferring patients from other health professionals. Procedures may be contained in national protocols published by the Australian Commission on Safety and Quality in Health Care (ACSQHC), relevant state and territory or federal guidance and workplace materials.

Infection control risk management includes managing transmission modes of hospital-acquired infections (host, agent and environment), preventing transmission (including effective hand hygiene) and implementing NHMRC Australian Guidelines for the Prevention and Control of Infection in Healthcare (2019 guidelines).

Quality frameworks may include workplace specific frameworks, relevant jurisdictional publications and frameworks relevant to the context of practice, such as the *Australian Safety and Quality Framework for Health Care* published by the ACSQHC.

Equipment includes all main and accessory equipment (instruments) used to image or treat a patient.

Good order may be achieved by following cleaning and hygiene protocols, calibration/testing regimes and acceptable operating standards. Issues affecting the functioning of equipment must be fully resolved before imaging or treating patients.

Incident reporting requirements may be identified in protocols and procedures and workplace materials and may include legal requirements identified in the relevant state and territory or federal legislation and regulations, including those published by the Australian Radiation Protection and Nuclear Safety Agency.

Control measures must include time, distance and patient shielding.

Domain 6: Leader and Steward

This domain covers medical radiation practitioner's responsibility to engage in shared decision-making for the efficient, effective operation and continual improvement of the healthcare system[19]. Medical radiation practitioners engage with others to navigate and enhance complex healthcare systems and take responsibility for the delivery of high-quality patient care through their activities as clinicians, administrators, academics, and teachers.

Leadership in the context of these professional capabilities does not solely relate to individuals with formal management roles or positions within an organisation or practice setting. Rather, it applies to all medical radiation practitioners with general registration and encompasses an individual's capacity to promote effective team functioning, understand the judicious use of resources and contribute to system improvements to support a progressive, accountable and efficient healthcare system.

The capabilities within this domain have been adapted from the CanMEDS Physician Competency Framework: Leader Role[20]. Key capabilities are common to all three divisions of the register of medical radiation practitioners.

Key capabilities	Enabling components
1. Contribute to the improvement of healthcare delivery in teams, organisations and systems.	a. Embed the principles of patient centred care to practice and systems. b. Apply the principles of quality improvement to contribute to improving systems of patient care. c. Use and apply health informatics to improve the quality of patient care and to optimise patient safety. d. Apply the principles of interprofessional practice to support patient centred care. e. Contribute to a collective decision-making culture that promotes patient safety.
2. Lead and support stewardship of healthcare systems.	a. Understand and maintain awareness of the strategic goals, plans and needs of the local, state and national health systems. b. Understand, support and lead improvements in models of care, performance and culture. c. Understand and lead efforts to address the health impacts of climate change. d. Understand and lead the responsible use of health system resources to support optimal patient care. e. Collaborate with other health practitioners to facilitate change and enhance health systems and health outcomes. Enhancements should be grounded in principles of co-design with patients and communities.
3. Leadership as a professional practice.	a. Communicate with clarity and compassion, addressing difficult topics while maintaining relationships and self-regulation. b. Accountable for decisions, navigates conflict, sets direction, allocates resources, and delegates effectively. c. Adapt to change and navigate uncertainty with confidence. d. Balance competing priorities, assesses and mitigates risks while making principled, ethical decisions under pressure. e. Align micro and macro perspectives, translates high-level strategy into actionable impact for teams and stakeholders. f. Expand influence beyond local team to drive broader organisational and system-wide impact.

Domain 6: Explanatory Notes

Stewardship of healthcare system refers to the accountability of governments for leadership of the healthcare system and their role for providing a strategic policy framework combined with effective oversight, coalition building, regulation, and attention to system–design.

19 Silva JAM, Mininel VA, Fernandes Agreli H, Peduzzi M, Harrison R, Xyrichis A. Collective leadership to improve professional practice, healthcare outcomes and staff well-being. Cochrane Database Syst Rev. 2022 Oct 10;10(10):CD013850. doi: 10.1002/14651858.CD013850.pub2. PMID: 36214207; PMCID: PMC9549469.

20 Royal College of Physicians and Surgeons of Canada. (2015). CanMEDS 2015 Physician Competency Framework. CanMEDS Framework (royalcollege.ca)

At the professional practice level stewardship refers to the efforts that registered medical radiation practitioners, within their sphere of influence, can contribute to the care for the healthcare system. Stewardship at the practice level takes into consideration fairness, equity, cultural safety, sustainability and must not add further to health inequalities.

Health informatics involves the acquisition, storage, retrieval, and use of healthcare information to improve health outcomes and provide accurate and accessible data at the right time. Health informatics relies on health data and may include the use of digital health systems. (see Domain 1 Key capability 4 and 5)

Addressing the health impacts of climate change Clinical care contributes more than half of the greenhouse gas emissions produced by health systems. Medical radiation practitioners should understand and apply frameworks that are designed to embed low-emissions models of care, including actions to improve care, minimise wasteful health care and involve patients in decisions about appropriate care

See the Joint Statement: Working together to achieve sustainable high-quality health care in a changing climate

The safe, sustainable and responsible use of use heath resources. Minimising wasteful health care will not only reduce greenhouse gas emissions, but it will also contribute to improving patient care, decreasing harms from overdiagnosis and overtreatment, minimises the physical and mental health impacts of climate change, and prioritises care for people who need it the most.

Medical radiation practitioners are required to use health resources responsibly and sustainably. This includes minimising waste, optimising resource allocation, using evidence-based practices, and considering environmental, cultural safety and health equity impacts of health resource use and allocation.

Medical radiation practitioners must prioritise patient safety while reducing unnecessary examinations or treatments and promoting preventive care where possible.

See also the Medical Radiation Practice Board of Australia's Code of Conduct.- 6.1 Use healthcare resources wisely.

Glossary of key terms

Term	Definition
Accreditation committee	Appointed by the Medical Radiation Practice Board of Australia, the Medical Radiation Practice Accreditation Committee is responsible for implementing and administering accreditation.
Accreditation standards	Used to assess whether a program of study, and the education provider that provides the program, provides people who complete the program with the knowledge, skills and professional attributes to safely and competently practise as a medical radiation practitioner in Australia.
Cultural safety for Aboriginal and Torres Strait Islander Peoples	Cultural safety for Aboriginal and Torres Strait Islander Peoples is defined in the National Scheme's Aboriginal and Torres Strait Islander Health and Cultural Strategy as the individual and institutional knowledge, skills, attitudes, and competencies needed to deliver optimal healthcare for Aboriginal and Torres Strait Islander Peoples[21].
Apply knowledge	Indicates a practitioner is expected to apply detailed knowledge in the practice setting.
Clinically acceptable treatment plans	The International Commission on Radiation Units and Measurements sets out the requirements to develop a clinically acceptable treatment plan.
Education provider	The term used by National Law to describe universities, tertiary education institutions or other institutions or organisations that provide vocational training, or specialist medical colleges or health professional colleges.
Enabling components	Describe the essential and measurable characteristics of the corresponding key capabilities and facilitate assessment of performance in the practice setting. Medical radiation practitioners are expected to demonstrate all enabling components for all key capabilities for safe and competent practice. This includes applying, adapting and synthesising new knowledge and skills gained from experience to continually improve performance.
Examination/treatment	The terms examination/treatment are common terms used in the context of particular divisions of practice.
Impairment	The term 'impairment' has a specific meaning under the National Law in Australia. It means the person has a physical or mental impairment, disability, condition or disorder (including substance abuse or dependence) that detrimentally affects, or is likely to detrimentally affect: a. A registered health practitioner or an applicant for registration in a health profession, the person's capacity to practise the profession, or b. A student, the student's capacity to undertake clinical training— i. as part of the approved program of study in which the student is enrolled; or arranged by an education provider[22].
Key capabilities	Describe the key features of safe and competent practice in a range of contexts and situations of varied complexity and uncertainty. During any one examination/treatment, practitioners are expected to demonstrate key capabilities from various domains. This recognises that competent professional practice is more than a sum of each discrete part and needs an ability to draw on and integrate the breadth of capabilities to support overall performance.
Learning outcomes	The expression of the set of knowledge, skills and the application of the knowledge and skills a person has, and is able to demonstrate, as a result of learning (note: adapted from: *Australian Qualifications Framework*, January 2013).

21 Ahpra & National Boards (2020). National Scheme's Aboriginal and Torres Strait Islander Health and Cultural Strategy. Australian Health Practitioner Regulation Agency – National Scheme's Aboriginal and Torres Strait Islander Health and Cultural Safety Strategy (Ahpra.gov.au)

22 Section 5 of the of the Health Practitioner Regulation National Law Act as in force in each state and territory in Australia (the National Law).

Term	Definition
Localisation	Techniques used to conform the radiation dose distribution to the target(s) of interest while sparing surrounding normal tissues.
Medicines	A medication in this context refers to anything administered to a patient to create or enhance a diagnostic quality image; and/or where imaging is used as part of an interventional procedure (note: taken from DIAS Practice Accreditation Standards). A medicine may also include, but is not limited to, contrast media.
Physical stabilisation	Techniques and methods used by medical radiation practitioners to ensure the positioning of patients is precise and reproducible.
Procedures	May refer to procedures and protocols (i.e. NSQHS Standards) or may refer to medical procedures. Procedures can also be used interchangeably with examination/treatment.
Program of study	A program of study provided by an education provider. Note the term 'course' is used by many education providers.
Radiation therapy localisation/Radiation therapy treatment planning	Radiation therapy localisation or radiation therapy treatment planning is the preparation of the patient for radiation therapy treatment and includes positioning the patient (with masks and casts where relevant), performing a clinical mark-up/skin markings and CT planning. CT planning describes the process where a patient needs to complete a CT scan for the purposes of planning a proposed radiation therapy treatment, including correct patient placement and ascertaining appropriate doses of radiation therapy to be administered[23]. MRI and PET are also used in radiation therapy localisation. Radiation therapy localisation is separate to localisation used in education which refers to the artificial representation of a real-world process to achieve educational goals via experimental learning[24].
Understand	Indicates a practitioner is expected to apply broad knowledge and understanding of information for safe practice.

23 Cancer Council NSW, 2017, Planning the treatment, viewed 14 November 2018 [www.cancercouncil.com.au/cancer-information/cancer-treatment/radiation-therapy/external-beam-radiation-therapy/planning-treatment].

24 Flangan B, Nestel D, Joseph M. Making patient safety the focus: Crisis resource management in the undergraduate curriculum. Medical education. 2004;38:56–66.

Abbreviations

Abbreviation	Definition
Ai	Artificial intelligence
ACSQHC	Australian Commission on Safety and Quality in Healthcare
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
CRT	Conformal radiation therapy
CT	Computed Tomography
EMR	Electronic medical records
IMRT	Intensity-modulated radiation therapy
LGBTIQA+	Lesbian, gay, bisexual, transgender, intersex, queer/questioning, asexual
MHR	My Health Record
MRI	Magnetic resonance imaging
NHMRC	National Health and Medical Research Council
NSQHS	National Safety and Quality Health Service
PACS	Picture and Archiving Communication System
PET	Positron emission tomography
RIS	Radiology information system
ROIS	Radiation oncology information systems
SPECT	Single-photon emission computed tomography
VMAT	Volumetric-modulated arc therapy