Guidelines: National examination

Effective from: 1 December 2015

Introduction

These guidelines and specifications have been prepared to assist candidates for the Medical Radiation Practice Board of Australia examination. The guideline contains information about:

- the format and requirements of the examination
- the capabilities required to satisfy the requirements of the examination
- preparing for the examination
- suggested reading lists for the examination
- examination rules, and
- how examination results may be used by the Board.

For more information candidates should refer to the *National examination* section of the Board's website.

Assuring capability to practise

The national examination is based on the Board's *Professional capabilities for medical radiation practitioners* which are the capabilities required of entry level practitioners, demonstration of which is necessary for *eligibility* for general registration.

The examination is constructed from a blueprint based on the *professional capabilities* and is designed to assess a practitioner's:

- ability to review critically, analyse, consolidate and synthesise knowledge
- ability to differentiate theoretical concepts, to exercise critical thinking and judgement in identifying and solving problems
- initiative and judgement in planning, problem solving and decision-making in professional practice
- capacity to analyse a range of circumstances encountered in clinical practice, and evaluate options to maximise patient care
- capacity to adapt knowledge and skills in diverse contexts, and
- accountability for professional practice and inter-professional practice.

When the Board may require an examination

The examination will support effective improvement in the quality and integrity of decision-making when assessing applications for general registration as a medical radiation practitioner.

The Board may use an examination

- before deciding an application for registration
- where a practitioner is not qualified for general registration
- where a practitioner is returning to practice after an extended break from practice
- where there are concerns about a supervised practitioner's capacity to practise safely

The regulatory principles for the National Scheme guide the Board in its decision-making, including decisions where a practitioner, or a class of practitioners, may be required to undertake an examination.

As such the examination will be used in circumstances where a more detailed and objective assessment of a practitioner's capability to practise in the profession is required. The examination will be used to establish a form of equivalence in professional capability to practise, and therefore meet the *qualification* requirements for general registration under section 53 of the National Law.

Medical radiation practitioners registered with the New Zealand Medical Radiation Technologists Board who hold a current practising certificate without conditions or limitations, and who apply for general registration, are exempt from sitting the examination in line with the requirements of the Trans-Tasman Mutual Recognition arrangement.

Structure of the examination

The exam is a computerised multiple choice question (MCQ) format. The multiple choice question format is a form of assessment in which respondents are asked to select the best possible answer out of a number of choices.

The exam will be up to 3 three hours (180 minutes) long. However, candidates are required to be available for a total of four hours to complete registration procedures, a pre-examination and post-examination administration activities.

The examination will contain up to 200 questions that can be separated into two broad categories:

- about 50 per cent of questions will come from the practice area relevant to the division of registration, that is:
  - Domain 5a Diagnostic radiography questions, or
  - Domain 5b Nuclear medicine technology questions, or
  - Domain 5c Radiation therapy questions

  and,
- about 50 per cent of questions will come from Domains 1-5 (not including 5a, 5b, 5c) which are common capabilities for medical radiation science.

Questions will not be evenly distributed across domains, for example, in any examination, there may be more questions from Domain 4: Radiation safety and risk management, than another domain.

The exam will include questions related to all levels of the human lifecycle including *in-utero*, neo-natal, paediatric, adult and older adult. Exam questions will reflect health situations relevant to all these phases of the human lifecycle.

Exam questions are mostly in the format of:

- single topic questions, or
- a vignette or clinical scenario.

All questions have four options, of which one is the correct answer and three are incorrect. The correct answers are determined by the National Examination Committee. The correct answer is the best, or most correct option, in the view of the committee. The National Examination Committee reviews all questions for content validity and analyses their statistical reliability, which provides the basis for further question development and improvement.

Taxonomy

	Common questions (Domain 1,2,3,4,5)	**45-55%**
	Division of Practice questions (Domain 5a, 5b, or 5c)	**45-55%**
	Total	**100%**

Common		**Questions per exam**
1	**Professional and Ethical Conduct**	9 - 12%

2	**Professional Communication & Collaboration**	5 - 7%
3	**Evidence Based Practice and Learning**	1 - 3%
4	**Radiation Safety and Risk Management**	18 - 20%
5	**Practice in medical radiation science**	12 - 14%
		45-55%

An examination will include one of the following practice domains (domain 5a – diagnostic radiography, or 5b - nuclear medicine technology, or 5c – radiation therapy) Questions from the practice domains will make up between 45% and 55% of an examination.		
5a	**Practice in Diagnostic Radiography**	
	General radiography examinations	17 - 19%
	Fluoroscopy	6 - 7%
	Computed tomography	14 - 16%
	Angiography and Interventional techniques	4 - 6%
	Magnetic resonance Imaging	2%
	Ultrasound Imaging	2%
	Mammography	1%
		45-55%

5b	**Practice in Nuclear Medicine**	
	Preparation and assessment of radiopharmaceuticals	5 - 10%
	Bio-distribution of radiopharmaceutical including therapies	3 - 6%
	Routine nuclear medicine imaging	20 - 22%
	Computed tomography	6 - 8%
	Delivery of radiopharmaceuticals for imaging and therapy	5 - 10%
	In vivo and in vitro laboratory procedures	2 - 5%
		45-55%

5c	**Practice in Radiation Therapy**	
	Patient preparation and therapy stabilisation	6 - 9 %
	Treatment simulation techniques	9 - 11%
	Treatment planning	16 - 18%
	Computed tomography	2 - 5%
	Implement treatment plans	11 - 13%
		45-55%

Standard of the examination

The national exam is based on the Board's published *Professional capabilities for medical radiation practitioners*. The *Professional capabilities* set entry-level requirements for medical radiation practice and form part of eligibility requirements for general registration. These eligibility requirements are relevant to

- practitioners qualified in Australia
- practitioners who qualified overseas
- practitioners requiring remediation, and
- practitioners returning to practice.

The *Professional capabilities* identify the minimum knowledge, skills and professional attributes necessary for practice. During professional practice it is expected that practitioners will demonstrate elements from a number of capability domains in any given circumstance. This recognises that competent professional practice is more than the sum of each discrete part. It requires an ability to draw on and integrate the breadth of capabilities to support overall performance.

To demonstrate capability, a candidate must apply their knowledge holistically to a clinical problem or appropriately manage the clinical environment.

The professional capability of graduates from approved programs of study is assessed during the program and in a variety of ways. For those practitioners who have not completed an approved program of study the Board uses an examination to evaluate the candidate's capacity for applying knowledge and clinical reasoning.

Professional capabilities for medical radiation practice

As indicated above, the *professional capabilities* identify the minimum knowledge, skills and professional attributes necessary for safe, independent practice in diagnostic radiography, nuclear medicine technology and radiation therapy. In order to be granted general registration, a medical radiation practitioner must be able to demonstrate these capabilities.

The capabilities have been grouped into domains which identify elements of practice. The domains for the professional capabilities for medical radiation practice are:

Domain 1: Professional and ethical conduct

Domain 2: Professional communication and collaboration

Domain 3: Evidence-based practice and professional learning

Domain 4: Radiation safety and risk management, and

Domain 5: Practice in medical radiation science (common), and either:

Domain 5a: Practice in diagnostic radiography, or

Domain 5b: Practice in nuclear medicine, or

Domain 5c: Practice in radiation therapy.

Competent professional practice requires an ability to draw on and integrate the breadth of capabilities during the usual course of practice. For this reason the examination will investigate a practitioner's capacity to apply elements from a number of domains to gather information, establish the clinical question, consider evidence and intuit, conclude or devise a plan to answer or resolve the clinical question.

The Professional capabilities for medical radiation practitioners can be found on the Board's website.

Preparation for the examination

Candidates with little or no recent study or practice are likely to have difficulty with the examination.

Candidates for the examination should:

1. read and understand the requirements of the *Professional capabilities for medical radiation practitioners*
2. review the reading and resource list included at **Appendix A** and use these resources in conjunction with the *Professional capabilities for medical radiation practitioners*
3. develop a program of revision of academic and professional literature that aims to meet the *professional capabilities* requirements, and.
4. attempt the practice exam

Additional needs

Candidates with a disability are able to request support to provide appropriate assistance to allow them to sit the examination. Special needs requests need to be made to the National Exam Co-ordinator by email to mrpexam@ahpra.gov.au at least 30 days in advance of a scheduled exam.

Candidates with special needs will be provided with facilities to support the following.

- Mobility condition: all exam centres have wide passages, wheelchair access, accessible toilets and adjustable desks.
- Visual impairment: the examination can be delivered with larger fonts and higher contrasting colour, and reader assistance.
- Hearing impairment: site support can be provided to ensure that invigilators can communicate instructions in a satisfactory manner.
- Other mental or physical impairment: other impairments, supported by appropriate documentation, are addressed case-by-case.

Examination rules

All formal examinations have rules in relation to their conduct. However, there are some rules that, if breached, would have a significant impact on the candidate's future capacity to sit an examination, or to be or remain registered.

Before sitting the examination, candidates will be required to agree to a set of terms and conditions regarding the examination, including keeping the content of the examination and questions confidential.

- Candidates are not permitted to take any reference material (electronic or hard copy) into the examination venue or to use during the examination.
- Mobile phones and other equipment must not be taken into the examination.
- Access to the Internet is not permitted in the examination rooms or in the examination waiting areas.

Breach of the code of conduct

Candidates sitting an examination are subject to the usual rules of ethical and professional conduct.

Failure to comply with the rules of an examination or any instruction of the invigilator may be regarded as a breach of professional conduct.

The Board regards misconduct during an examination as a serious matter. Falsifying results, fraudulent or dishonest conduct in connection with an examination has the potential for practitioners who are not qualified or not otherwise competent and safe to practise, to be improperly registered. In such cases the Board will consider any complaint and may refer the matter to a responsible tribunal. If a tribunal finds a

complaint sustained it may make a range of orders including cancellation of registration and disqualifying a person from applying for registration for a specified period.

Meeting identification requirements

Examination centres will require each candidate to provide two forms of identification, one of which must be a government issued photo identification. To satisfy the identification requirements an invigilator may ask you to produce additional photographic identification. You should therefore consider bringing more than one form of photographic identification, from a reputable source, to establish your identification.

Where an invigilator has a reasonable concern about your ability to properly establish your identify or there is a concern that identity documents are being misused, you will be refused access to the exam.

Fraudulent use of identity documents is a serious matter and may be referred to police.

If you are refused access to the exam you will forfeit the fees paid to sit the examination.

Scoring the examination

The examination operates as a pass/fail examination, with the pass mark set to ensure that practitioners adequately meet the Board's *Professional capabilities for medical radiation practitioners*. All questions are of equal value and there is no deduction of marks for wrong answers. Individual questions are not weighted and contribute equally to the candidate's overall examination mark.

The passing score is determined by the Board's National Examination Committee (NEC) and is set at a level that ensures that candidates are safe to practise. When setting the passing score, the NEC considers other data, including statistical and performance data, to ensure the standard that candidates must achieve is fair, valid and consistent with the principles and objectives of the National Law.

The passing score may be adjusted after the conduct of examination. For illustration purposes only - on occasion a particular question and its answer (and/or distracters) may have become impossible to use accurately. This may be due to the grammar or expression used, or, on review, there is more than one reasonable answer for a question. In these circumstances a question may be removed from the exam and marks for all examinees adjusted accordingly.

Previous exam papers

Previous exam papers will not be made available.

Practice examination

A practice exam is available for candidates who have registered and paid to sit an examination. The practice exam is a sample set of questions that provides candidates with a sense of how the exam is structured, the types and style of questions and how exam time will need to be managed.

Examination results

Your exam results will be provided approximately 4 week after you have sat the exam.

Failing the exam

To be eligible for general registration you must pass the examination. If you fail the examination, ordinarily the Board will propose to refuse your application for registration. The process of proposal includes an opportunity where you are able to make a submission before a decision is made.

Special consideration

Special consideration is not a means of circumventing the Board's usual examination process.

Special consideration may be available to candidates who are unable to sit or complete an examination due to exceptional circumstance beyond their control. Candidates may be given an opportunity to re-sit the examination at the next available date without incurring additional examination fees.

Applications for special consideration:

- will only be accepted from eligible candidates
- will not be approved unless, in the view of the National Examination Committee or an Examiner in Chief, there are exceptional circumstances beyond the control of the candidate, and
- must be supported by adequate evidence to satisfy the National Examination Committee or an Examiner in Chief

Special consideration may be available where the following circumstances reasonably and materially impact on a candidate's capacity to sit an exam (whether imminently or during an exam)

- acute illness (such as hospital admission, onset of serious illness)
- loss or bereavement (such as death of a close family member)
- hardship or trauma (such as being the victim of crime, severe disruption to domestic life)
- unforeseen call-up for service (such as military service, court appearance, jury service, emergency service)
- work commitments and circumstances beyond the candidate's control (a letter on company/organisation letterhead from an employer confirming this must be attached to the application for special consideration)
- religious convictions (a letter from a religious leader must accompany the application)
- computer malfunction at the examination centre, or
- bomb threat or similar such event necessitating the evacuation of the examination centre.

A request for special consideration that is based on the content of the examination will not be considered.

Special consideration will not lower the pass mark, nor will it improve a candidates overall score. A successful application for special consideration will only allow a candidate to sit (re-sit) a future examination without incurring additional fees levied by the Board.

Board may refuse to grant or renew registration

The examination is set at the minimum capabilities level for safe practise in the profession. The Board may refuse a new application or an application to renew registration for postgraduate training or supervised practice for any of the following reasons:

- you have failed an examination
- you have engaged in misconduct in connection with an examination

Revision table

Dec 2016	Revised information about failing the exam
Dec 2016	Added additional information on exam taxonomy

Appendix A: Suggested reading and resources list

Exam preparation resources

Candidates are required to manage their own preparation for the examination. Part of that preparation will often include reading and revising academic textbooks and other professional resources.

The list of resources below provides a good cross section of academic and professional material commonly used in medical radiation practice. It is not an exhaustive list and candidates may need to source additional reference material to assist in their preparation for the exam. Reading and revising all of the items on this list does not guarantee success as the exam.

When searching for other reference and resource material, candidates should take care to ensure that the material is relevant to current professional practice. Please be careful when using resources that reference overseas laws, regulatory requirements or specific practice requirements in those jurisdictions as they may differ from practice in Australia.

Medical Radiation Practice Board of Australia, Code of conduct.

Medical Radiation Practice Board of Australia, Mandatory notification guidelines.

Medical Radiation Practice Board of Australia, Professional capabilities for medical radiation practitioners (2020).

Medical Radiation Practice Board of Australia video resources, see: See something, Say Something – Communicating for Safety.

Other registration standards, codes, guidelines and policies of the Medical Radiation Practice Board of Australia.

Cultural safety resources

National Scheme's Aboriginal and Torres Strait Islander Health and Cultural Safety Strategy

Queensland Government, Queensland Health, *Aboriginal and Torres Strait Islander Patient care guideline see :* Aboriginal and Torres Strait Islander Patient Care Guidelines (health.qld.gov.au)

Victorian Government, Department of Health and Human Services, *Aboriginal and Torres Strait Islander cultural safety* webpage, see: Department of Health and Human Services Victoria | Aboriginal and Torres Strait Islander cultural safety framework (dhhs.vic.gov.au)

Australian Government, Australian Institute of Health and Welfare (AIHW), *Cultural safety in health care for Indigenous Australians: monitoring framework*, see: Cultural safety in health care for Indigenous Australians: monitoring framework, Summary - Australian Institute of Health and Welfare (aihw.gov.au)

Other resources

Australian Commission on Safety and Quality in Healthcare (accessible from website) relevant publications, including:

Australian Charter of Healthcare Rights.
NSQHS Standards.
Patient Clinician Communication.
Communicating for Safety.
Recognising and responding to acute physiological deterioration.
Reduction in Radiation Exposure to Children and Young People from CT Scans.

Professional practice resources

Hand Hygiene Australia, '5 Moments of Hand Hygiene', see: www.hha.org.au.

National Health and Medical Research Council Guidelines and Publications website section.

Berglund, C (2012) Ethics for Health Care. 4th edition. OUP Australia & New Zealand

Scher, S Kozlowska, K (2018) Rethinking Health Care Ethics. Springer

Allan, S (2019) Law and ethics for health practitioners. Elsevier Health Sciences

Anatomy, physiology and pathophysiology resources

Martini, F. H. Nath,J.L. Bartolomew, E.F. (2019) Fundamentals of Anatomy & Physiology. 11th edition. Person Education Ltd. Harlow. United Kingdom.

Moore, K.L. Dalley, A.F. Agur, A.M.R. (2017) Clinically Oriented Anatomy 8th edition. Lippincott Williams and Wilkins, United States of America

Widmaier EP, Raff, H and Strang KT, (2018) Vander's Human Physiology: The Mechanisms of Body Function, 15th edition. McGraw-Hill: Sydney

Hubert, R.J.Vanmeter, K.C. (2018) Gould's Pathophysiology for the Health Professions. 6th edition. Elsevier - Health Sciences Division

Pharmacology resources

Katzung, B.G (2017) Basic and Clinical Pharmacology. 14th Edition. McGraw-Hill Education

Radiation physics and protection

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), Radiation Protection Series, see: https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications

Bushong S.C. (2020) Radiologic Science for Technologists: Physics, Biology and Protection, 12th edition. Elsevier - Health Sciences Division

Samei, E Peck, D.J (2019) Hendee's Physics of medical imaging. 5th edition. John Wiley & Sons

Seeram, E (2019) Rad Techs Guide to Radiation Protection. 2nd edition. John Wiley & Sons

Abrahams, R.B Huda,W Sensakovic,W (2019) Imaging Physics Case Review. Elsevier Health Sciences

Digital image processing and storage

Carter, C. Veale, B (2018) Digital Radiography and PACS. 3rd edition. Elsevier - Health Sciences Division

Seeram, E (2019) Digital Radiography: Physical principles and quality control 2nd edition. Springer

Radiomics and clinical data measurement

Juijiang Li, Lei Xing, Napel, S Rubin, D.L. (2019) Radiomics and radiogenomics: technical basis and clinical applications. CRC Press.

Computed tomography resources

Seeram, E. (2018). "CT at a glance." John Wiley & Sons

Hsieh, J. (2015). "Computed Tomography: Principles, design, artifacts, and recent advances", SPIE Optical Engineering Press, Bellingham, WA.

Radiographic pathology resources

Chowdhury, R Wilson, I Rofe, C Lloyd-Jones, G (2017) Radiology at a Glance. 2nd edition. John Wiley & Sons

Eisenberg, R Johnson, N.M. (2020) Comprehensive Radiographic Pathology 7th Edition. Mosby.

Singh, A (2019) Emergency Radiology: Imaging of Acute Pathologies 2nd edition. Springer International Publishing

Ultrasound resources

Gill, Robert (2020) The Physics and Technology of Diagnostic Ultrasound: A Practitioner's Guide. High Frequency Publishing; 2nd ed.

Rumack, C.M. Levine, D (2018) Diagnostic ultrasound. 5th edition. Elsevier

Australian Sonographers Association - *Clinical guidelines*, see www.sonographers.org/resources-tools/clinical-guidelines.

MRI resources

Hashemi, R.H., Bradley, W.G., Lisanti, C. (2017) MRI: The Basics. 4th edition. Lippincott Williams and Wilkins

Diagnostic radiography resources

Long, B.W. Rollins, J Smith, B (2018) Merrill's Atlas of Radiographic Positioning and Procedures,14th Edition. Elsevier - Health Sciences Division

Lampignano, J Kendrick, L.E. 92017) Bontrager's Textbook of radiographic positioning and related anatomy. 9th edition. Elsevier Health Sciences.

McQuillen Martensen K (2020) Radiographic Image Analysis, 5th edition, Elsevier - Health Sciences Division

Nuclear medicine resources

Mettler, F.A. Guiberteau, M.J. (2018) Essentials of nuclear medicine and molecular imaging. 7th edition. Elsevier Health Sciences.

Lin, E.C. Alavi, A (2019) PET and PET/CT: A clinical guide. 3rd edition. Thieme.

Chandra, R Rahmin, A (2017) Nuclear medicine physics: the basics. 8th edition. Lippincott Williams & Wilkins

Zimmerman, R (2017) Nuclear medicine: Radioactivity for diagnosis. 2nd edition. EDP Science.

Saha, G.B. (2017) Fundamentals of nuclear pharmacy. 7th Ed. Springer

Radiation therapy resources

Gibbons, J (2019) Khan's The Physics of Radiation Therapy. 6th Edition. Lippincott Williams and Wilkins

Washington, C.M. Leaver, D.T. (2019) Washington & Leaver's Principles and Practice of Radiation Therapy. 5th edition. Elsevier Health Sciences

Small, W Tarbell, N.J Yao, Min (2017) Clinical radiation oncology: Indications, techniques and results. 3rd edition. John Wiley & Sons.

Pawlicki, T. Dunscombe, P Mundt, A Scalliet, P (2011) Quality and Safety in Radiation Therapy. CRC Press.

Cancer Institute NSW, *Radiation Oncology protocols*, see: www.eviQ.org.au.