



Medical Radiation Technologists Board

Competencies Required for the Practice of:

NUCLEAR MEDICINE

November 2010

Copyright

This document is copyright to the Medical Radiation Technologists Board (the Board) and should not be reproduced in whole or part without permission of the Board.

©	First Edition	December 1999
	Second Edition	June 2002
	Third Edition	September 2004
	Fourth Edition	June 2009
	Current Edition	November 2010

Revision

It is the intent of the Board that this document be reviewed at least once every three years. The profession cannot be static due to the ongoing emergence of new analysis and treatment techniques. This document has been written in such a way that new changes in practice and technology can be accommodated readily within the parameters.

INTRODUCTION

This document sets out the competencies and skills required by the Medical Radiation Technologists Board (the Board) to practise Nuclear Medicine technology in New Zealand in a safe, professional, patient, and focused manner.

The aim is to register:

- Entry level practitioners who are capable of functioning with a high level of independence, as well as being able to work as part of a team, to provide quality cost-effective services.
- Graduates who have attained a comprehensive knowledge base that enables specialisation in advanced procedures including those with separate registration requirements.
- Graduates who are responsible and caring, who have developed attitudes and skills that enable adaptation to health reforms, ongoing ethical issues and technological advances.

The document is based on the need for professional competencies consistent with the recommendations of the International Professional Bodies.

Please note: this document is not to be viewed as a curriculum. Teaching related to a particular competency can take many different forms and may occur at any time during a course.

REGISTRATION IN A SPECIFIED SCOPE OF PRACTICE

Medical radiation technology is a registered occupation in New Zealand. It is a legal requirement for people wishing to call themselves medical radiation technologists and practice in any of the defined scopes of practice of medical radiation technology, to be registered with the Medical Radiation Technologists Board and to hold a current practising certificate.

The Board has defined the competencies and skill levels required for medical radiation technologists to be registered in any of the following scopes of practice:

1. Diagnostic Imaging General Technologist
2. Radiation Therapist
3. Nuclear Medicine Technologist
4. Magnetic Resonance Imaging Technologist
5. Sonographer

REQUIRED COMPETENCIES

The competencies detailed in this document identify the set of key minimum competencies required to register and practise in the Nuclear Medicine Technologist scope of practice, and include a definition of the skills and knowledge required to fulfil those competencies.

These minimum competencies are used to:

- Set national standards for the Nuclear Medicine Technologist scope of practice in medical radiation technology.
- Cross-reference/assess overseas applicants' qualifications for registration in New Zealand.

- Identify areas in which prospective Nuclear Medicine Technologists need education to comply with New Zealand standards.
- Provide guidelines for tertiary institutions who are providing or anticipating providing a course in Nuclear Medicine technology.
- Assist in the development of core standard units in education.
- Monitor programme delivery in the educational institutions.

COMPETENCIES AND SKILL LEVELS

The Board has identified a set of generic competencies that are applicable to and required for registration in all five defined scopes of practice. In addition the Nuclear Medicine Technologist scope of practice has a number of competencies that are specific to Nuclear Medicine.

Each competency area is further defined by a number of required skills. Each of these skills is then defined according to a required skill level. The Board has identified three distinctive skill levels:

3. Can perform the skill satisfactorily without guidance and/or supervision
2. Can perform the skill satisfactorily but requires guidance and/or supervision
1. Can perform some parts of the skill satisfactorily but requires guidance and/or supervision to perform the entire skill

Competency and Learning Outcomes Index

Competency Area	Skill	Skill Level
1 Communication	1.1 Respect others as individuals 1.2 Interpret information 1.3 Utilise appropriate communication media 1.4 Demonstrate appropriate staff interactions 1.5 Demonstrate appropriate interactions with others 1.6 Perform in an instructional/educational role	3 3 3 3 3 2
2 Apply professional standards	2.1 Use protocols, policies and procedures 2.2 Apply regulations and guidelines 2.3 Apply Board's Code of Ethics 2.4 Practise as a professional 2.5 Maintain standards of practice	3 3 3 3 3
3 Provide holistic patient care	3.1 Assess and provide for physical and psychological needs of patients 3.2 Demonstrate basic patient care skills 3.3 Apply first aid and emergency procedures 3.4 Ensure patient care	3 2/3 3 3
4 Maintain safe practices	4.1 Identify and apply relevant safety requirements and procedures 4.2 Identify equipment faults 4.3 Minimise potential hazards - chemical 4.4 Minimise potential hazards - physical 4.5 Minimise potential hazards - biological 4.6 Minimise potential hazards - electrical 4.7 Minimise potential hazards - ionising and non-ionising radiation	3 3 2/3 3 3 3 3
5 Operate equipment	5.1 Describe the principles and operation of equipment 5.2 Prepare equipment for use 5.3 Use ancillary equipment 5.4 Operation of equipment 5.5 Use processing equipment 5.6 Use data storage equipment 5.7 Ensure equipment is maintained	3 3 3 3 3 3 3
6 Imaging requirements	6.1 Interpret request form 6.2 Evaluate patient compatibility with protocols and imaging requirements 6.3 Obtain informed consent 6.4 Ensure patient preparation 6.5 Recognise the need to consult	3 3 3 3 3

Competency Area	Skill	Skill Level
7 Produce diagnostic image	7.1 Select appropriate equipment 7.2 Select appropriate technique/protocol 7.3 Position patient 7.4 Acquire image 7.5 Process and evaluate image 7.6 Assess further requirements	3 3 3 3 3 3
8 Management	8.1 Describe and apply management principles 8.2 Demonstrate stock control measures 8.3 Contribute to work flows to optimise equipment, resources and facilities 8.4 Contribute towards an optimal cost effective service	3 3 3 3
9 Quality service management	9.1 Describe fundamental principles of quality management 9.2 Participate in and evaluate quality assurance programmes	3 2/3
10 Research and professional development	10.1 Describe principles of research and development 10.2 Initiate a report on research and development 10.3 Demonstrate an understanding of the principles of continuing professional development (CPD)	3 2 3
11 Laboratory Procedures	11.1 Prepare radiopharmaceuticals for administration 11.2 Radio isotope generator systems 11.3 Radiation hazards relating to unsealed radioactive sources 11.4 Prepare labelled cells for in-vivo use 11.5 In-vivo (non-imaging) procedures 11.6 Venipuncture and other injection techniques	3 3 3 3 3 3

Skills Development Profile

Competency Area Communication

Skill 1.1 Respect others as individuals

Performance Criteria The MRT must be able to:

1. Identify ways in which gender, age, ethnicity, culture, socioeconomic status, disability and other factors may impact on interpersonal interactions.
 2. Evaluate appropriate respect, empathy, cultural sensitivity and rapport in a variety of situations.
 3. Establish and maintain rapport.
-

Skill Level 3

Learning Outcome Demonstrates respect for all others in clinical and professional situations

Content Values and self concept

Social, culture, religious and gender grouping

Physical and mental disabilities

Communication styles

Appropriate and inappropriate rapport

Empathy

Treaty of Waitangi

Health beliefs and attitudes

Skills Development Profile

Competency Area	Communication
Skill	1.2 Interpret information
Performance Criteria	<p>The MRT must be able to:</p> <ol style="list-style-type: none"> 1. Demonstrate skills of active listening. 2. Demonstrate observational skills and appropriate responses in clinical settings. 3. Demonstrate the ability to interpret information appropriately . 4. Discuss a range of ways in which instructions may be given, and evaluate the effectiveness of each.
Skill Level	3
Learning Outcome	Uses appropriate listening and observational skills and appropriate responses in the clinical setting
Content	<p>Processing and analysing information</p> <p>Sequencing instructions</p> <p>Verification process</p> <p>Sensory feedback</p> <p>Body language</p> <p>Physical signs and symptoms</p> <p>Language/jargon</p> <p>Articulation and clarity</p> <p>Safety/screening protocols</p>

Skills Development Profile

Competency Area Communication

Skill 1.3 Utilise appropriate communication media

Performance Criteria The MRT must be able to:

1. Identify areas where communication of data is part of the professional role.
 2. Describe and evaluate a range of media which can be used to communicate information.
 3. Identify confidentiality issues in relation to documentation.
 4. Demonstrate communication through a range of media.
-

Skill Level 3

Learning Outcome Use a range of media to communicate information effectively

Content

Office systems

Patient data documentation

Quality assurance documentation

Library systems

Written, oral, electronic media

Confidentiality

Privacy Act 1993

Health Information Privacy Code 1994

Skills Development Profile

Competency Area Communication

Skill 1.4 Demonstrate appropriate staff interactions

Performance Criteria The MRT must be able to:

1. Describe the role of the MRT in a variety of clinical settings and situations.
 2. Discuss factors which facilitate or interfere with a team meeting its objectives.
 3. Identify ways in which a team can resolve conflict.
 4. Identify leadership styles
 5. Demonstrate knowledge of the role and function of other staff groups within a clinical setting.
 6. Demonstrate ability to function within a multidisciplinary team.
-

Skill Level 3

Learning Outcome Interacts with staff in an appropriate professional manner in a range of clinical settings and situations

Content

- Professionalism
- Barriers to communication
- Organisational structures
- Leadership
- Group dynamics
- Conflict resolution
- Multidisciplinary team setting

Skills Development Profile

Competency Area	Communication
Skill	1.5 Demonstrate appropriate interactions with others
Performance Criteria	The MRT must be able to: <ol style="list-style-type: none"> 1. Determine the behaviours which are appropriate to patient, public and the health practitioner relationship.
Skill Level	3
Learning Outcome	Uses appropriate interactions with patients, public, and peers in a range of clinical settings and situations
Content	Professionalism Patients' rights and responsibilities Human rights Health Practitioners Competence Assurance Act 2003 Health and Disability Commission Act 1994 Code of Health and Disability Consumers Rights 1996

Skills Development Profile

Competency Area Communication

Skill 1.6 Perform in an instructional/educational role

Performance Criteria The MRT must be able to:

1. Discuss the role of the MRT as instructor.
 2. Discuss the role of the MRT as educator.
 3. Describe and apply the ways in which individuals learn.
 4. Identify and apply a range of teaching methods.
-

Skill Level 2

Learning Outcome Communicates with individuals and groups in a role which facilitates understanding and learning

Content Preparation of educational material

 Methods of facilitating learning

 Feedback/assessment/evaluation

 Use of educational aids

 Clinical supervision

Skills Development Profile

Competency Area Apply professional standards

Skill 2.1 Use protocols, policies and procedures

Performance Criteria The MRT must be able to:

1. Evaluate the role of protocols.
 2. Select and apply relevant protocols, policies and procedures.
-

Skill Level 3

Learning Outcome Complies with protocols, policies and procedures

Content Types of protocols
Technique fundamentals
Health and safety
Organisational protocols, policies and procedures

Skills Development Profile

Competency Area Apply professional standards

Skill 2.2 Apply regulations and guidelines

Performance Criteria The MRT must be able to:

1. Locate relevant legislation.
 2. Apply relevant legislation to workplace.
 3. Identify responsibilities of designated staff.
-

Skill Level 2 or 3 (as indicated in the content)

Learning Outcome Complies with legislation and codes of safe practice in all aspects of work

Content

2

Accident Compensation Corporation booklet on the Code of Safe Practice (Chemical)

Official Information Act 1982

Consumer Guarantees Act 1993

Employment Legislation:
Holidays Act 2003
Employment Relations Act

3

Health Practitioners Competence Assurance Act 2003

Health and Disability Commissioners Act 1994 and Code of Health and Disability Consumers Rights 1996

Health and Safety in Employment Act 1992

Privacy Act 1993 and Health Information Privacy Code 1994

New Zealand Bill of Rights 1990

Human Rights Act 1993

Radiation Protection Act 1965

National Radiation Laboratory Codes of Safe Practice

RANZCR Guidelines

Skills Development Profile

Competency Area Apply professional standards

Skill 2.3 Apply the Board's Code of Ethics

Performance Criteria The MRT must be able to:

1. Describe the role and application of the Code of Ethics.
 2. Evaluate ethical principles relating to health care systems.
 3. Discuss moral positions in relation to ethical problems.
-

Skill Level 3

Learning Outcome Complies with the Board's Code of Ethics

Content Concept of ethics and morals

- Ethical principles
 - Medico-legal issues
 - Privacy/confidentiality
 - Informed consent
 - Patient advocacy
 - Patient rights and responsibilities
 - Bioethics
 - Values
-

Skills Development Profile

Competency Area Apply professional standards

Skill 2.4 Practise as a professional

Performance Criteria The MRT must be able to:

1. Identify professional domain and responsibilities.
 2. Justify boundaries created by own value system.
 3. Evaluate extent of own competency.
 4. Maintain minimum competency standards.
 5. Determine professional limitations.
 6. Display personal integrity.
-

Skill Level 3

Learning Outcome Demonstrates professional, competent behaviour

Content Self and peer appraisal/evaluation

Principles of professionalism

Skills Development Profile

Competency Area Apply professional standards

Skill 2.5 Maintain standards of practice

Performance Criteria The MRT must be able to:

1. Identify and participate in continuing education opportunities.
 2. Demonstrate professional accountability for their work and behaviour.
 3. Discuss the legal implication of errors
 4. Support peers in acquisition of knowledge and skills.
-

Skill Level 3

Learning Outcome Demonstrates commitment to professional responsibility and accountability

Content Evaluation and appraisal programmes

Annual practising certificates

Professional associations and affiliations

Continuing professional development

Relevant legislation

International standards of practice

Skills Development Profile

Competency Area Provide holistic patient care

Skill 3.1 Asses and provide for physical and psychological needs of patients

Performance Criteria The MRT must be able to:

1. Identify when there is a need to assist the patient.
 2. Demonstrate a non-judgmental caring respect for patients in all situations.
 3. Discuss age and developmental differences in patients.
 4. Perform procedures ensuring patient safety.
 5. Identify and respond to patient's psychosocial needs.
-

Skill Level 3

Learning Outcome Responds appropriately to an assessment of a patient's physical and psycho-social condition

Content	Human development	Special needs
	Manual handling	Warmth and comfort
	Privacy and confidentiality	Safety and security
	Anxiety, depression and stress	Empathy
	Human motivation and emotion	Human rights
	Health and Disability Commission Act 1994	Claustrophobia

Skills Development Profile

Competency Area Provide holistic patient care

Skill 3.2 Demonstrate basic patient care skills

Performance Criteria The MRT must be able to:

1. Recognise the need for basic patient care practices.
 2. Demonstrate basic patient care practices.
-

Skill Level 2 or 3 (as indicated in content)

Learning Outcome Demonstrates an ability to carry out basic patient care skills

Content	2	3
	Dressings	Aseptic technique
	IV check/assist skills	Toileting patients
	Suction	Infection control
	Oxygen saturation monitor	Manual handling techniques
		Signs of life
		Wound/skin reactions
		Contrast media and other drugs commonly used in the clinical setting

Skills Development Profile

Competency Area Provide holistic patient care

Skill 3.3 Apply first aid and emergency procedures

Performance Criteria The MRT must be able to:

1. Identify when there is an emergency situation.
 2. Describe protocols for dealing with an emergency situation.
 3. Identify patients at risk from allergic reactions.
 4. Demonstrate first aid to the level as expected of a comprehensive first aid certificate.
-

Skill Level 3

Learning Outcome Reacts appropriately in an emergency situation

Content

Cardio Pulmonary Resuscitation

Emergency protocols

Triage procedures

Signs and symptoms of allergic reaction

Signs and symptoms of respiratory and cardiac arrest

Diabetic/asthmatic and other high-risk patients

Skills Development Profile

Competency Area Provide holistic patient care

Skill 3.4 Ensure patient care

Performance Criteria The MRT must be able to:

1. Discuss procedure instructions with patients.
 2. Recognise physical signs of procedural complications.
 3. Describe interventions in a crisis situation.
 4. State and carry out care during and post procedure.
 5. Describe post procedure instructions to patients.
-

Skill Level 3

Learning Outcome Demonstrates holistic patient care

Content

Procedural complication

Critical situation intervention

Post procedure care

Ongoing instruction

Communicate with appropriate personnel

Skills Development Profile

Competency Area Maintain safe practices

Skill 4.1 Identify and use relevant safety regulations and procedures

Performance Criteria The MRT must be able to:

1. Implement the principles which dictate the criteria for a safe environment and practice.
-

Skill Level 3

Learning Outcome Demonstrates knowledge and application of documents relative to safe practice

Content

- Legislation
- Regulations
- Policies, protocols and procedures
- Standards of practice
- Incident reporting
- Hazard identification

Skills Development Profile

Competency Area Maintain safe practices

Skill 4.2 Identify equipment faults

Performance Criteria The MRT must be able to:

1. Identify when equipment is not operating correctly.
 2. Verify fault where possible through appropriate test procedure.
 3. Implement reporting and corrective action procedures.
 4. Identify appropriate follow-up procedure.
-

Skill Level 3

Learning Outcome Demonstrates recognition of equipment faults and responds appropriately

Content Equipment design

Principles of equipment operation

Quality assurance procedures

Physical environment

Service protocols

Skills Development Profile

Competency Area	Maintain safe practices										
Skill	4.3 Minimises potential hazards - chemical										
Performance Criteria	<p>The MRT must be able to:</p> <ol style="list-style-type: none"> 1. Recognise chemical hazards in the workplace. 2. Demonstrate ways of minimising chemical hazards. 3. Describe the effects on the body of chemicals used in the workplace. 										
Skill Level	2 or 3 (as indicated in content)										
Learning Outcome	Maintains a working environment safe from chemical hazards										
Content	<table border="0"> <tr> <td style="vertical-align: top;">2</td> <td style="vertical-align: top;">3</td> </tr> <tr> <td>Resource Management Act 1991</td> <td>Health and Safety in Employment Act 1992</td> </tr> <tr> <td>Air-conditioning/venting systems</td> <td>Chemical handling/storage/spills</td> </tr> <tr> <td></td> <td>Protective equipment</td> </tr> <tr> <td></td> <td>Monitoring of staff - sensitivity, allergies</td> </tr> </table>	2	3	Resource Management Act 1991	Health and Safety in Employment Act 1992	Air-conditioning/venting systems	Chemical handling/storage/spills		Protective equipment		Monitoring of staff - sensitivity, allergies
2	3										
Resource Management Act 1991	Health and Safety in Employment Act 1992										
Air-conditioning/venting systems	Chemical handling/storage/spills										
	Protective equipment										
	Monitoring of staff - sensitivity, allergies										

Skills Development Profile

Competency Area Maintain safe practices

Skill 4.4 Minimise potential hazards - physical

Performance Criteria The MRT must be able to:

1. Recognise physical hazards in the workplace.
 2. Demonstrate ways of minimising physical hazards in the workplace.
-

Skill Level 3

Learning Outcome Maintains a working environment safe from physical hazards

Content Types of physical hazards

Emergency equipment and systems

Emergency procedures

Design of equipment and accessories

Safe use of equipment

Ergonomics

Skills Development Profile

Competency Area Maintain safe practices

Skill 4.5 Minimise potential hazards - biological

Performance Criteria The MRT must be able to:

1. Recognise biological hazards in the workplace.
 2. Demonstrate ways of minimising biological hazards in the workplace.
 3. Display ability to decrease the risk of cross infection in a department.
-

Skill Level 3

Learning Outcome Maintains a working environment safe from biological hazards

Content Correct use and disposal of sharps

Infection control and universal precautions

Sterile procedures

Waste disposal

Skills Development Profile

Competency Area Maintain safe practices

Skill 4.6 Minimise potential hazards - electrical

Performance Criteria The MRT must be able to:

1. Recognise electrical hazards in the workplace.
 2. Demonstrate ways of minimising electrical hazards in the workplace.
-

Skill Level 3

Learning Outcome Maintains an electrically safe environment in the workplace

Content

Relative risks

Fault reporting procedures

Electrical regulations regarding zones

Basic electrical safety

Compatibility of equipment with other electrical devices

Equipment manual

Skills Development Profile

Competency Area Maintain safe practices

Skill 4.7 Minimise potential hazards - ionising radiation and non-ionising radiation

Performance Criteria The MRT must be able to:

1. Recognise radiation hazards.
 2. Demonstrate ways to minimise radiation hazards.
 3. Describe the potential effects of radiation on the body.
 4. Rationalise radiation dose in terms of risk versus benefit.
-

Skill Level 3

Learning Outcome Maintains a working environment safe from radiation hazards

Content

Radiobiology

National Radiation Laboratory publications

Non-ionising radiation

Concepts of dose

Personnel monitoring

Radiation protection

ALARA principle (As Low As Reasonably Achievable)

Skills Development Profile

Competency Area	Operate equipment
Skill	5.1 Describe the principles and operation of equipment
Performance Criteria	The MRT must be able to: 1. Explain the correct and safe operation of the imaging equipment, dose calibrator and radiation monitoring equipment.
Skill Level	3
Learning Outcome	Demonstrates an understanding of the principles and operation of radiation detection equipment within the nuclear medicine department
Content	Radiation physics and equipment Dose calibrator Survey meters Sample measuring equipment Gamma cameras Uptake measuring equipment SPECT/CT PET/CT

Skills Development Profile

Competency Area Operate equipment

Skill 5.2 Prepare equipment for use

Performance Criteria The MRT must be able to:

1. Describe equipment preparation for imaging procedures.
-

Skill Level 3

Learning Outcome Demonstrates preparation procedures for a range of equipment

Content Room preparation

Equipment preparation

Start-up procedures

Skills Development Profile

Competency Area Operate equipment

Skill 5.3 Use ancillary equipment

Performance Criteria The MRT must be able to:

1. Evaluate the need for the use of specific ancillary equipment.
 2. Discuss the use of ancillary equipment.
 3. Use ancillary equipment as necessary.
-

Skill Level 3

Learning Outcome Selects and demonstrates effective and safe use of ancillary equipment

Content

- Quality assurance/safe practices
- Immobilisation/compression devices
- Collimators
- Fault finding and reporting
- Data archive and storage devices
- Gating systems
- Radiation monitoring equipment
- Emergency trolley equipment
- Lung ventilation equipment
- Syringe pumps
- Radiotherapy equipment

Skills Development Profile

Competency Area	Operate equipment
Skill	5.4 Operation of equipment
Performance Criteria	<p>The MRT must be able to:</p> <ol style="list-style-type: none"> 1. Apply knowledge of the structure and function of equipment to enable its efficient and safe use 2. Operate imaging equipment effectively. 3. Demonstrate the effective use of computer systems. 4. Operate non-imaging (counting) equipment.
Skill Level	3
Learning Outcome	Demonstrates the effective and safe use of equipment
Content	<p>Computer work stations</p> <p>Processors</p> <p>Gamma cameras</p> <p>PET/CT</p> <p>SPECT/CT</p> <p>Dose calibrator</p> <p>Radiation monitoring equipment</p>

Skills Development Profile

Competency Area Operate equipment

Skill 5.5 Use processing/printing equipment

Performance Criteria The MRT must be able to:

1. Perform standard processing/printing procedures.
 2. Maintain processing/printing equipment for ongoing use.
 3. Describe fault finding procedures.
 4. Participate in a maintenance programme for all processing/printing equipment.
-

Skill Level 3

Learning Outcome Demonstrates the safe and effective use of processing/printing equipment

Content Processing/printing systems
Image identification
Quality assurance programmes
Health and safety

Skills Development Profile

Competency Area Operate equipment

Skill 5.6 Use data storage equipment

Performance Criteria The MRT must be able to:

1. Evaluate image storage media in terms of their suitability for various applications.
 2. Describe data and image processing procedures.
 3. Demonstrate storage manipulation and retrieval of data and images from various systems.
-

Skill Level 3

Learning Outcome Utilises data storage equipment effectively

Content

Image reconstruction

Image archival

Co registration

Fusion

Post processing presentation

Storage devices

Information systems

Data storage

Skills Development Profile

Competency Area Operate equipment

Skill 5.7 Ensure equipment is maintained

Performance Criteria The MRT must be able to:

1. Describe the role of quality assurance with respect to equipment.
 2. Perform regular quality control procedures and evaluate data.
 3. Understand the need for planned maintenance.
-

Skill Level 3

Learning Outcome Ensures all imaging and associated equipment is maintained for operational use

Content

Equipment specifications

Planned maintenance

Quality assurance

Calibration

National Radiation Laboratory checks

Fault reporting system

Sealed source checking

Skills Development Profile

Competency Area Imaging requirement

Skill 6.1 Interpret request form

Performance Criteria The MRT must be able to:

1. Evaluate the appropriateness of the request form and recognise the need for further clinical input
 1. Differentiate between the types of imaging requests
 2. Demonstrate an understanding of medical terminology.
 3. Explain the significance of pathological terms.
 4. Assess the urgency of the form/request.
 5. Assess the preliminary patient requirements.
-

Skill Level 3

Learning Outcome Interprets the request form

Content

Medical terminology

Anatomy and physiology

Pathology

Basic biochemistry

Skills Development Profile

Competency Area	Imaging requirements
Skill	6.2 Evaluate patient compatibility with protocols and imaging requirements
Performance Criteria	<p>The MRT must be able to:</p> <ol style="list-style-type: none"> 1. Discuss possible problems/limitations and suggest adaptations to technique. 2. Assess the patient's psychological needs with respect to the examination being performed. 3. Relate and apply protocols to the situation presented. 4. Assess the patient's medical and physical limitations with respect to the examination performed. 5. Assess the patient for possible contra-indications for the examination presented. 6. Act as patient advocate.
Skill Level	3
Learning Outcome	Determines the appropriate protocol/modality to suit the required diagnostic outcome
Content	<p>Interview techniques</p> <p>Physical limitations</p> <p>Biological limitations</p> <p>Psychological factors</p> <p>Equipment limitations</p> <p>Pathology</p>

Skills Development Profile

Competency Area Imaging requirements

Skill 6.3 Obtain informed consent

Performance Criteria The MRT must be able to:

1. Describe the principles of informed consent.
 2. Explain all examination procedures to the patients and their relatives where appropriate.
 3. Display a high level of interpersonal skills.
 4. Identify patients correctly.
 5. Ensure patients' rights concerning consent are not compromised.
-

Skill Level 3

Learning Outcome Ensures that informed consent is obtained appropriate to the examination

Content

- Identification methods
- Regulations/protocols
- Procedural explanations
- Principles of informed consent
- Interpersonal skills
- Levels of consent
- New Zealand Bill of Rights Act 1990

Skills Development Profile

Competency Area Imaging requirements

Skill 6.4 Ensure patient preparation

Performance Criteria The MRT must be able to:

1. Describe patient preparations appropriate to procedures.
 2. Deliver appropriate explanations to patients regarding their examinations.
 3. Instruct patients in the correct preparation for the examination.
 4. Supervise the appropriate physical preparation.
 5. Verify the instructions given to patients have been carried out.
-

Skill Level 3

Learning Outcome Ensures correct patient preparation

Content Understanding of examinations
Physical and psychological needs
Documentation prior and present
Local procedures manual

Skills Development Profile

Competency Area Imaging requirements

Skill 6.5 Recognise the need to consult

Performance Criteria The MRT must be able to:

1. Evaluate information presented.
 2. Develop a network of information resources.
 3. Recognise the need for input from other sources.
 4. Access relevant sources of information.
 5. Follow department protocols.
-

Skill Level 3

Learning Outcome Demonstrates consultation necessary to facilitate the procedure

Content Knowledge of procedures

Sources of information

Self awareness of personal capabilities

Continuing professional education

Skills Development Profile

Competency Area Produce diagnostic image

Skill 7.1 Select appropriate equipment

Performance Criteria The MRT must be able to:

1. Describe the capability of various equipment.
 2. Compare features of available equipment.
 3. Discuss selection of equipment appropriate for use.
-

Skill Level 3

Learning Outcome Demonstrates appropriate selection of equipment consistent with the examination to be performed

Content Examination requested

Accessory equipment

Collimators

Radiation protection

Capabilities of the patient

Skills Development Profile

Competency Area Produce diagnostic image

Skill 7.2 Select appropriate technique/protocol

Performance Criteria The MRT must be able to:

1. Describe the technique appropriate to the examination.
 2. Relate knowledge of anatomy and physiology to the examination.
 3. Discuss possible adaptations to standard techniques.
-

Skill Level 3

Learning Outcome Evaluates information obtained and makes the appropriate choice of technique/protocol

Content

- Technique knowledge
- Positioning knowledge
- Department protocols
- Anatomy, pathology and physiology
- Availability of resources
- Clinical indications
- Adaptability
- Use of Co-registration/fusion technology

Skills Development Profile

Competency Area Produce diagnostic image

Skill 7.3 Position patient

Performance Criteria The MRT must be able to:

1. Discuss methods of safely moving the patient.
 2. Demonstrate a knowledge of surface anatomy to enable accurate and safe positioning.
 3. Demonstrate the safe handling of equipment and ancillary devices.
 4. Position the patient, source of radiation and image recording device, and any ancillary equipment appropriately.
-

Skill Level 3

Learning Outcome Demonstrates the correct positioning of the patient for acquiring the image

Content Anatomy and surface anatomy

Palpitation skills

Manual handling skills

Patient assessment

Technique adaptations

Equipment manoeuvrability

CT Co-registration

Skills Development Profile

Competency Area Produce diagnostic image

Skill 7.4 Acquire images

Performance Criteria The MRT must be able to:

1. Evaluate and determine suitable combinations of imaging factors and image recording materials to produce optimum images.
 2. Apply the principle of image/data acquisition.
 3. Accurately acquire a diagnostic study.
-

Skill Level 3

Learning Outcome Demonstrates the acquisition of an image using a range of equipment

Content Image acquisition techniques

Data acquisition techniques

Technical factors and relationships

Radiation safety procedures

SPECT/CT and PET/CT

Skills Development Profile

Competency Area Produce diagnostic image

Skill 7.5 Process and evaluate image

Performance Criteria The MRT must be able to:

1. Perform the steps involved in the production and storage of a permanent and visible image.
 2. Discuss evaluation criteria for diagnostic images.
 3. Evaluate the diagnostic and technical quality of the study.
 4. Describe post-acquisition processing techniques.
-

Skill Level 3

Learning Outcome Demonstrates the production and evaluation of an image

Content Post acquisition manipulation

Attenuation Correction and anatomical mapping

Image evaluation criteria:

- technical
 - anatomical
 - pathological
 - physiological
-

Skills Development Profile

Competency Area Produce diagnostic image

Skill 7.6 Assess further requirements

Performance Criteria The MRT must be able to:

1. Ascertain whether further imaging is necessary to complete the examination in progress.
 2. Describe and discuss the application of complementary and supplementary procedures.
-

Skill Level 3

Learning Outcome Evaluates a full range of procedures necessary to enable a satisfactory diagnosis

Content Problem-solving skills
Complementary procedures
Supplementary procedures

Skills Development Profile

Competency Area Management

Skill 8.1 Describe and apply management principles

Performance Criteria The MRT must be able to:

1. Describe the basic principles of management.
 2. Demonstrate basic management skills.
 3. Demonstrate proficient time management skills.
 4. Discuss the rationale of performance appraisal systems.
-

Skill Level 3

Learning Outcome Utilises the basic principles of management

Content Organisation, planning and control

Delegation

Negotiation

Industrial relations

Rostering

Performance evaluation

Interview/curricula vitae

Time management

Discipline

Skills Development Profile

Competency Area Management

Skill 8.2 Demonstrate stock control measures

Performance Criteria The MRT must be able to:

1. Describe purchasing procedures.
 2. Describe stock holding methods.
 3. Discuss documentation associated with ordering goods and supplies.
 4. Assess the safety, accessibility and storage of goods and supplies.
-

Skill Level 3

Learning Outcome Recognise appropriate levels of goods and supplies

Content

- Rotation
- Ordering
- Stock level
- Suitability
- Storage
- Safety
- Suppliers
- Responsibility
- Environmental impact chemicals
- Accessibility

Skills Development Profile

Competency Area Management

Skill 8.3 Contribute to work flows to optimise equipment resources and facilities

Performance Criteria The MRT must be able to:

1. Evaluate available resources to enable their efficient and effective use to provide the service.
 2. Discuss principles of rostering.
 3. Assess patient condition to enable prioritisation.
 4. Evaluate work flow patterns to enable the optimum use of resources.
-

Skill Level 3

Learning Outcome Recognise the need for a working schedule that is flexible and adaptable to meet service requirements

Content

- Knowledge of departmental protocols
- Knowledge of equipment capabilities
- Staff resources and capabilities
- Appointment systems
- Workflow patterns
- Rostering
- Planned maintenance

Skills Development Profile

Competency Area Management

Skill 8.4 Contribute towards an optimal cost effective service

Performance Criteria The MRT must be able to:

1. Discuss the economic use of resources consistent with procedure outcomes.
 2. Participate in planning for routine maintenance.
 3. Identify strategies to enable maximum utilisation of supplies.
-

Skill Level 3

Learning Outcome Demonstrates the prudent use resources

Content	Costs	Equipment
	Staff levels	Department philosophy
	Facilities	Appointment schedules
	Silver recovery	Equipment/machine maintenance
	Strategic planning	Support services
	Business plans	Reject film analysis
	Communication systems	Work flow patterns

Skills Development Profile

Competency Area Quality service management

Skill 9.1 Describe fundamental principles of quality management

Performance Criteria The MRT must be able to:

1. Define the principles of quality management.
 2. Discuss the need for quality management.
-

Skill Level 3

Learning Outcome Demonstrates an awareness of the principles of quality management

Content

- Definitions
- Standards
- Cost-effectiveness
- Quality assurance
- Safety
- Accountability

Skills Development Profile

Competency Area Quality service management

Skill 9.2 Participate in and evaluate quality assurance (QA) programmes

Performance Criteria The MRT must be able to:

1. Discuss the effectiveness of QA programmes.
 2. Develop and perform QA procedures.
 3. Recognise the need to consult.
 4. Demonstrate an ability to evaluate QA programmes.
 5. Implement and monitor remedial measures when necessary.
-

Skill Level 2 or 3 (as indicated in content)

Learning Outcome Participates in and evaluates quality assurance programmes

Content	2	3
	Systems appraisal	QA protocols/systems
	Evaluation methods	Policies, protocols, and procedures

Skills Development Profile

Competency Area Research and professional development

Skill 10.1 Describe principles of research and development

Performance Criteria The MRT must be able to:

1. Describe various methods of data collection.
 2. Compare methods of research.
 3. Discuss issues relating to intellectual property.
 4. Discuss methods of analysis.
 5. Describe principles of supervision.
 6. Discuss ethical considerations for research.
-

Skill Level 3

Learning Outcome Describes the principles of research

Content

Research models

Methods of research

Data collection

Analysis of data

Reporting of data

Supervision

Ethical considerations

Dissemination of research outcomes

Skills Development Profile

Competency Area Research and professional development

Skill 10.2 Initiate a report on research and development

Performance Criteria The MRT must be able to:

1. Adhere to ethical guidelines.
 2. Identify resources.
 3. Produce and present research proposal to appropriate body.
 4. Identify and negotiate with an appropriate supervisor.
 5. Outline the mechanism by which research can be carried out.
 6. Compile and present research report.
-

Skill Level 2

Learning Outcome Undertakes basic research resulting in a written document

Content Writing proposals/applications

Identify source of funding

Awareness of ethical considerations

Analysis of data

Literature review

Preparation of research material

Awareness of publishing criteria

Methodology and design

Skills Development Profile

Competency Area Research and professional development

Skill 10.3 Demonstrate an understanding of the principles of continuing professional development (CPD)

Performance Criteria The MRT must be able to:

1. Discuss the concept of CPD and life-long learning.
-

Skill Level 3

Learning Outcome Demonstrates a knowledge of and participates in CPD

Content

- Performance appraisal methods
- Health Practitioners Competence Assurance Act 2003
- Code of Ethics
- Continuing professional development programme
- Board requirements
- Evidence-based practice

Skills Development Profile

Competency Area Laboratory procedures

Skill 11.1 Prepare radiopharmaceuticals for administration

Performance Criteria The MRT must be able to:

1. Ascertain the most suitable radiopharmaceutical for a given study.
 2. Label commercially supplied kits using "closed" systems.
 3. Perform QC procedures on radiopharmaceuticals.
 4. Assay the correct dose for administration.
 5. Recognise patterns of radiopharmaceutical failure.
-

Skill Level 3

Learning Outcome Demonstrates knowledge and skill in all aspects of routine radiopharmaceutical preparation

Content Radiopharmaceuticals

Aseptic technique

Documentation and labelling

Shelf life

NRL reference activities (and variance)

Chromatography

Skills Development Profile

Competency Area Laboratory procedures

Skill 11.2 Radio isotope production systems

Performance Criteria The MRT must be able to:

1. Describe the principles and operation of generator systems.
 2. Be aware of other radiopharmaceutical production.
 3. Perform calculations relating to growth/decay.
 4. Perform QC procedures on radiopharmaceutical production.
-

Skill Level 3

Learning Outcome Demonstrates knowledge of and skill in the use of radio isotope production

Content Aseptic technique

Shelf life

Molybdenum and other breakthrough products

Decay calculations

Radioactive concentration calculations

Skills Development Profile

Competency Area Laboratory procedures

Skill 11.3 Radiation hazards relating to unsealed radioactive sources

Performance Criteria The MRT must be able to:

1. Identify internal and external radiation hazards associated with unsealed radioactive sources used in the department.
 2. Use precautions and accessories to minimise the exposure to radiation.
 3. Carry out decontamination procedures if necessary.
 4. Carry out radioactive waste disposal in accordance with department protocols.
-

Skill Level 3

Learning Outcome Demonstrates knowledge and skill in minimising the risks associated with the use of unsealed radioactive sources

Content

Surface monitoring

Decontamination techniques

Vial and syringe shields

Protective gloves and clothing

Storage of radionuclides

Fume hoods

Disposal methods

Gamma, Beta and position emitters

Ionising radiation

Skills Development Profile

Competency Area Laboratory procedures

Skill 11.4 Prepare labelled cells for in-vivo use

Performance Criteria The MRT must be able to:

1. Discuss and perform different methods of cell labelling.
 2. Perform QC procedures on labelled cells.
-

Skill Level 3

Learning Outcome Label cells in accordance with department protocols

Content

Sterile technique

Laminar flow cabinet

Centrifuge operation

Labelling efficiency calculations

Skills Development Profile

Competency Area Laboratory procedures

Skill 11.5 In-vivo (non-ionising procedures)

Performance Criteria Where the department carries out non-imaging in-vivo tests, the MRT must be able to:

1. Demonstrate an understanding of the principles and methodology behind the test.
2. Carry out the test (referring to written protocols where necessary).
3. Operate sample-counting apparatus.
4. Perform necessary calculations and present results.

Skill Level 2/3

Learning Outcome Performs tests in accordance with department protocols and produces accurate results.

Content Use of laboratory equipment

Sample counting

GFR measurement

Red cell volume

Other in-vivo tests

Skills Development Profile

Competency Area Laboratory procedures

Skill 11.6 Venipuncture and other injection techniques

Performance Criteria Where the MRT is required to administer radiopharmaceuticals or take blood, they must be able to:

1. Discuss the choice of IV access.
 2. Demonstrate aseptic technique.
 3. Demonstrate good venipuncture technique.
 4. Recognise limitations and when to seek help.
 5. Demonstrate an understanding of function and handling of IV lines and pumps.
 6. Discuss physiological pathways, interactions and uptake mechanisms of administered radiopharmaceuticals.
-

Skill Level 3

Learning Outcome Performs venipuncture and IV administrations in accordance with department protocols

Content

Aseptic technique	Biohazards
Use of syringes	Use of syringe shields
Tourniquet	Blood sampling
Direct puncture, butterfly needles and cannulation	
Intravenous and intramuscular technique	
Sentinel node injection techniques	
Safe handling and administration of radiopharmaceuticals	

Glossary Specific to Learning Outcomes

Analysis	To break the subject up into its main ideas and evaluate them
Assess	To determine, estimate
Adapt	Assimilate and use new knowledge
Apply	Make use of; put to practical use
Define	State clearly and concisely the meaning of
Demonstrate	Make clear by examples and/or doing
Describe	Give a complete account of, in oral or in written form
Determine	Sort out and decide on, based on a judgement as to whether the conclusions are supported by data
Discuss	Analyse by argument and/or reasoning
Engage	Participate or take part in
Evaluate	Make judgements against criteria, standards and/or evidence
Explain	Analyse, clarify and draw conclusion(s)
Identify	Recognise according to established criteria
Integrate	Incorporate theory and practice into a total unit
Interpret	Bring out the meaning of, and draw conclusion(s)
Justify	To give a good reason for, validate, or substantiate a subject
Maintain	Keep to an agreed standard
Manage	Direct with a degree of skill
Modify	Make changes to an existing methodology
Outline	Give main points and essential supplementary materials in a systematic arrangement
Perform	To carry out and accomplish
Plan	Design and/or organise method or data or management
Practice	Carry out an action; perform a procedure under specified conditions

Relate	Establish logical or causal relationships
Report	Prepare and present a formal statement with conclusions
State	Express the main points in brief, clear narrative terms, oral or written
Summarise	Give the main points or facts in condensed oral or written form