

ISRRT Radiographer/Radiological Technologist Definition July 2021

The ISRRT acknowledges there are differing terms used nationally and by intergovernmental organizations such as the WHO, ILO and the IAEA to describe the radiography profession around the globe. The International Standard Classifications of Occupations (ISCO) organisation and the International Safety Standards publication have used differing terms to describe persons in the radiography profession according to tasks and duties performed or according to responsibilities for application of the principles of radiation protection and safety during exposure situations. The ISRRT agrees to use the term radiographer/radiological technologist in ISRRT documents.

The ISRRT will advocate the use of the term radiographer/radiological technologist to the public and at international, regional or national professional stakeholder's meetings.

Radiographers/radiological technologists are medical imaging and radiotherapy healthcare professionals who play a vital part of the multidisciplinary healthcare team. These professionals play a critical role in the delivery of health services to patients for diagnostic, therapeutic and research purposes and those who support the delivery of these services using ionizing radiation (x-ray), sound waves, magnetically induced radio signals, or radioactive materials to produce a diagnostic image or treat a patient. Radiographers/radiological technologists are educationally prepared and clinically competent with legal authorization to perform imaging or therapeutic procedures. Where permissible by regulation or law, radiographers/radiological technologists are fully accountable autonomous practitioners. The following are examples radiographers/radiological technologist modalities and specialties:

- Bone Densitometry
- Cardiac-Interventional and Vascular-Interventional Radiography
- Conventional Radiography (including Dental Radiography)
- Computed Tomography (CT)
- Delivery of Radiation Therapy Treatments
- Emergency Radiography
- Fluoroscopy
- Lithotripsy
- Magnetic Resonance (MR)



- Mammography
- Nuclear Medicine
- On Treatment Review and Support
- Radiation Safety and Quality Assurance
- Treatment Planning
- Ultrasound or Sonography

These Modalities or Specialties include all respective subspecialties under them e.g., SPECT, PET, PET CT, etc. under nuclear medicine

Radiographers/radiological technologists:

- think critically, use independent, professional and ethical judgment while integrating scientific knowledge, interdisciplinary communications, technical competence and patient interaction skills to provide safe and accurate procedures as an integral member of a multidisciplinary healthcare team.
- are professionally accountable to patients' physical and psychosocial wellbeing, prior to, during and following procedures.
- take an active role in justification and optimization of medical imaging and radiotherapeutic procedures and act as an interface between the patient and the technology in medical imaging and radiation therapy.
- are essential healthcare workers in radiation safety for patients, healthcare personnel and the public in accordance with the "As Low As Reasonably Achievable (ALARA)" principle and relevant legislation.
- practice independently and where permissible are accountable autonomous practitioners and provide safe, high quality, person-centered care while maintaining knowledge about radiation protection and safety and adhering to all rules and standards within their country's ethico legal practice framework.
- have responsibility for the outcome of the procedure and for patient-centered care before, during and after the procedure, and for the timely authorized distribution of clinical information (including medical images) to promote the progress of the care pathway and allow for consultation with other health practitioners.
- have responsibility for quality assurance, quality control and quality improvement as part of the multidisciplinary healthcare team.
- are responsible to engage in evidence-based practice and critically monitor their actions through a range of reflective processes.

Background research, ISRRT Director of Education Yudthaphon Vichianin

Objective: to define an appropriate definition for the term radiographer and radiological technologist for the ISRRT Council approval in 2021 at the ISRRT World Congress, Dublin Ireland.

Summary of the Information in the exploratory report draft definition report is as follows:

The term used to represent to radiographers and radiologic technologists that uses “radiographer” is found in Europe. In North America, it seems the term “radiologic technologist” is widely adopted and the term “Medical Radiation Technologist” is used in Canada. In Australia, the general term used by Laws is interchangeable between “medical radiation practitioner and medical imaging technologist.” For the Asian countries, a wide variety of the terms are used including radiographers and radiologic technologists.

Recommended terms that represent our profession are listed:

RADIOGRAPHERS (Endorsed by EFRS/ISRRT)
RADIOLOGIC TECHNOLOGISTS (North America)
RADIOLOGICAL TECHNOLOGIST (ISRRT/Asia)
MEDICAL IMAGING TECHNOLOGISTS AU
MEDICAL RADIATION TECHNOLOGIST-(Canda)

The medical radiation practitioner should be competent in five domains with a wide range of capabilities as shown in Figure 2.

Domains

The domains consist of key capabilities that are thematically arranged and describe the essential characteristics of a competent registered medical radiation practitioner in Australia and include:

Domain 1	Medical radiation practitioner: <ul style="list-style-type: none"> • 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	Evidence-informed practitioner
Domain 5	Radiation safety and risk manager

Figure 2. Five key competency domains by Australian Medical Radiation Practice Board

In the Domain 1: “medical radiation practitioner” is required to:

- Apply knowledge of anatomy, physiology and pathology to practice.
- Use clinical information management systems appropriately.
- Understand and apply the different methods of imaging and treatment.
- Confirm the procedure according to clinical indicators.
- Assess the patient’s/client’s capacity to receive care.
- Implement techniques for patient/client stabilization and reproducibility of procedures and outcomes.
- Deliver patient/client care.
- Apply knowledge of safe and effective use of medicines.
- Perform magnetic resonance imaging (MRI). (if applicable)
- Perform ultrasound imaging. (if applicable)

The sub-domain of Domain 1 includes:

- Domain 1A: Diagnostic radiographer: perform radiography, fluoroscopy, angiography, diagnostic computed tomography (CT) imaging
- Domain 1B: Nuclear medicine technologist: prepare and assess the purity of, radiopharmaceuticals, perform nuclear medicine examinations and therapies, perform in vivo and in vitro laboratory procedures when necessary, perform computed tomography (CT) imaging.
- Domain 1C: Radiation therapist: use equipment and perform techniques for patient’s position for radiation therapy, perform localization and pre-treatment imaging, perform treatment



planning, perform radiation therapy treatment according to approved radiation therapy prescriptions and treatment plans, perform computed tomography (CT) imaging.

In the Domain 2: "Professional and ethical practitioner": The medical radiation practitioner is required to practice in an ethical and professional manner, consistent with relevant legislation and regulatory requirements, provide each patient/client with dignity and care, take responsibility and accountability for professional decisions, advocate on behalf of the patient/client when appropriate, seek opportunities to progress the profession.

In the Domain 3: "Communicator and collaborator": The medical radiation practitioner are required to communicate clearly, sensitively and effectively with the patient/client and their family or careers, collaborate with other health practitioners

In the Domain 4: "Evidence-informed practitioner": The medical radiation practitioner is required to resolve challenges through application of critical thinking and reflective practice identifying ongoing professional learning needs and opportunities.

In the Domain 5: "Radiation safety and risk manager": The medical radiation practitioner is required to perform and provide safe radiation practice

Moreover "Health Direct" a government-funded service, providing quality, approved health information and advice has defined the term that "Radiographers are allied health professionals who take x-rays and other medical images to assist doctors in diagnosing diseases and injuries. They are also known as medical imaging technologists." (*What is a radiographer? What is a radiologist? [Internet].*

Healthdirect.gov.au. 2020 [cited 26 January 2020]. Available from:

<https://www.healthdirect.gov.au/what-is-a-radiographer-what-is-a-radiologist>)

Additionally, the International Labor Office (ILO) report, radiographers are defined in the sub-group 3211 as "Medical Imaging and Therapeutic Equipment Technicians". In this document, radiographers are defined in a sense of technician as "Medical imaging and therapeutic equipment technicians" who "test and operate radiographic, ultrasound and other medical imaging equipment to produce images of body structures for the diagnosis and treatment of injury, disease and other impairments." (figure 3)

(PART III: DEFINITIONS OF MAJOR GROUPS, SUB-MAJOR GROUPS, MINOR GROUPS AND UNIT GROUPS [Internet]. [cited 2020/01/25]. Available from: URL

<https://www.ilo.org/public/english/bureau/stat/isco/docs/groupdefn08.pdf>)



3211 Medical Imaging and Therapeutic Equipment Technicians

Medical imaging and therapeutic equipment technicians test and operate radiographic, ultrasound and other medical imaging equipment to produce images of body structures for the diagnosis and treatment of injury, disease and other impairments. They may administer radiation treatments to patients under the supervision of a radiologist or other health professional.

Tasks include –

- (a) operating or overseeing operation of radiologic, ultrasound and magnetic imaging equipment to produce images of the body for diagnostic purposes;
- (b) explaining procedures, observing and positioning patients, and using protection devices to ensure safety and comfort during examination, scan or treatment;
- (c) positioning imaging or treatment equipment, monitoring video displays, and adjusting settings and controls according to technical specifications;
- (d) reviewing and evaluating developed X-rays, videotape, or computer-generated information to determine if images are satisfactory for diagnostic purposes, and recording results of procedures;
- (e) monitoring patients' conditions and reactions, reporting abnormal signs to a medical practitioner;
- (f) measuring and recording radiation dosage or radiopharmaceuticals received and used for patients, following prescriptions issued by a medical practitioner;
- (g) administering, detecting and mapping radiopharmaceuticals or radiation in patients' bodies, using radioisotope, camera or other equipment for diagnosing and treating diseases;
- (h) recording and disposing of radioactive materials and storing radiopharmaceuticals, following radiation safety procedures.

Figure 3. Definition of radiographer by ILO

In this sub-category 3211, the radiographers are defined with skill level 3 major groups 3 “Technicians and Associate Professionals” as shown in figure 4.

Table 1 Mapping of ISCO-08 major groups to skill levels

ISCO-08 major groups	Skill level
1 Managers	3 + 4
2 Professionals	4
3 Technicians and Associate Professionals	3
4 Clerical Support Workers 5 Services and Sales Workers 6 Skilled Agricultural, Forestry and Fishery Workers 7 Craft and Related Trades Workers 8 Plant and Machine Operators, and Assemblers	2
9 Elementary Occupations	1
0 Armed Forces Occupations	1 + 2 + 4

Figure 4. ISCO-08 major group by ILO

However, information from the 20th International Conference of Labor Statisticians in Geneva during 10-19 October, 2018 indicating that several concerns arise from various professional organizations suggesting a clear need to differentiate the radiographers from technicians (sub-category 3211). The result from the ILO conference suggests that the occupations and job titles concerned here are:

- Diagnostic medical radiographer
- Magnetic resonance imaging technologist
- Mammographer
- Medical radiation therapist
- Nuclear medicine technologist
- Radiographer
- Radiotherapist
- Sonographer

These jobs titles should be move to Major group 2 (Professionals with Skill Level 4). The suggested group is the Sub-major group 22 Health Professionals with subgroup 226 Medical Technologists, and the sub category of "2261 Radiographers and Related Medical Imaging and Therapeutic Technologists"

Regarding the information obtained from various sources in this report as aforementioned, all related terms are listed in the following table for reference.

Table 1. Related terms collected by this exploratory report includes (but not limited to this list)

Term	Note
Radiographer (EU/Europe) Radiologic technologist (North America) Radiological technologist (East/South East Asia) Diagnostic radiographers Medical radiation technologist Diagnostic medical radiographer Magnetic resonance imaging technologist Mammographer Sonographer	Diagnostic Imaging
Radiation therapy technologist Radiation therapist Radiotherapy radiographer Medical radiation therapist Radiotherapist Therapeutic Radiographer	Radiation Therapy

Nuclear medicine technologist Nuclear medicine scientist	Nuclear medicine
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Suggestion and Summary

Learning from the information outlined in this report, the term used to represent radiographers and radiological technologists that uses “Radiographer” is found in Europe. In North America, it seems that the “Radiologic Technologist” is widely adopted. In Australia, the general term used by Laws is interchangeable between “Medical radiation practitioner and Medical imaging technologist”. For the Asian countries, a wide variety of the terms are used including Radiographers and Radiological Technologists.

As a result, the recommend terms that should represent our profession are listed here:

- Radiographers (Endorsed by EFRS/ISRRT)
- Radiologic Technologists (North America)
- Radiological Technologists (ISRRT/Asia)
- Medical Imaging Technologists (AU)

For the description of terms used to define those working in the radiography profession, this exploratory report uses a wide variety of information sources from online encyclopedia, online resources both professional and international bodies. A summary table shows retrieved definitions are listed here.

Table 2. Summary of definitions from sources

Sources	Definitions
EFRS	<p>Radiographers are medical imaging and radiotherapy experts who:</p> <ul style="list-style-type: none"> - are professionally accountable to the patients’ physical and psychosocial wellbeing, prior to, during and following examinations or therapy; - take an active role in justification and optimization of medical imaging and radio therapeutic procedures - are key-persons in radiation safety of patients and third persons in accordance with the “As Low As Reasonably Achievable (ALARA)” principle and relevant legislation
ILO	<p>Medical imaging and therapeutic equipment technicians test and operate radiographic, ultrasound and other medical imaging equipment to produce images of body structures for the diagnosis and treatment of injury, disease and other impairments. They may administer radiation treatments to patients under the supervision of a radiologist or other health professional.</p>

Healthdirect.gov.au	Radiographers are allied health professionals who take x-rays and other medical images to assist doctors in diagnosing diseases and injuries. They are also known as medical imaging technologists.
Wikipedia.com	Radiographers, also known as radiologic technologists, diagnostic radiographers and medical radiation technologists are healthcare professionals who specialize in the imaging of human anatomy for the diagnosis and treatment of pathology.
Encyclopedia.com	Health profession who involves in the use of ionizing radiation (x-ray), sound or radio waves, radioactive substances to produce an image, and magnetic imaging. The suggested would roles are related to x-ray, ultrasound, mammography, nuclear medicine, computerized axial tomography (CAT scan), radiation therapy, and magnetic resonance imaging (MRI).
TheFreeDictionary.com	A health care professional skilled in the theory and practice of the technical aspects of the use of x-rays and radioisotopes in the diagnosis and treatment of diseases” with specialize roles in “radiography, radiation therapy, or nuclear medicine

This report suggests to combine existing descriptions of radiographers/radiological or radiologic technologists from EFRTS with additional competencies from Australian Practice Board.

***“Radiographers, Radiologic Technologists, Radiological Technologists,
Medical Imaging Technologists”***

are medical imaging and radiotherapy experts who

- are professionally accountable to the patients’ physical and psychosocial wellbeing, prior to, during and following examinations or therapy;
- take an active role in justification and optimization of medical imaging and radio therapeutic procedures;
- are key persons in radiation safety of patients and third persons in accordance with the “As Low As Reasonably Achievable (ALARA)” principle and relevant legislation;
- practice independently and provide safe, high quality, patient/client-centered care;
- are responsible for the outcome of the diagnostic imaging examination, for patient/client care before, during and after the examination, and for the timely authorized distribution of medical images to allow for consultation with other health practitioners (diagnostic imaging);
- are responsible for planning and delivering radiation treatment, primarily for people diagnosed with cancer. Radiation therapists create and evaluate images for the localization, planning and delivery of radiation treatment according to the prescription of the radiation oncologist and provide patient/client care before, during and after radiation therapy (radiation therapy);
- are responsible for the outcome of the nuclear medicine examination, for patient/client care before, during and after the examination and for the timely authorized distribution of medical images to allow for consultation with other health practitioners (nuclear medicine);
- are responsible to engage in evidence-informed practice and to critically monitor their actions through a range of reflective processes.



The ILO definition is not suggested to include in this proposed definition due to the reason that the definition is crafted grounded upon the Major Group 3 'Technician and Associate Professionals' in the Skill Level 3.

In summary, the definition could be crafted based on the EFRS definition with some additional competencies from Australian Practice Board reflecting partial skill level 4 of the professionals with autonomous work, extended role from short/medium term training, and ability to perform evidence-based practice. This strategically drafted definition may play a great role on supporting our profession to the public in both national and international levels.

