

Specialty Training Requirements (STR)

Name of Specialty:	Radiation Oncology
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Note : In addition to the training requirements stated in this STR, residents must comply with any other regulatory requirements or practice-based requirements mandated by the healthcare institutions or place of practice.

Scope of Radiation Oncology

The subspecialty of oncology concerned with radiotherapy is called Radiation Oncology.

Radiation therapy or (may be used interchangeably) radiotherapy, is a therapy using ionising radiation, generally provided as part of cancer treatment to control or kill malignant cells and normally delivered by a linear accelerator. Radiation therapy may be curative in a number of types of cancer if they are localised to one area of the body. It may also be used as part of adjuvant therapy, to prevent tumour recurrence after surgery to remove a primary malignant tumour (for example, early stages of breast cancer). Radiation therapy is synergistic with chemotherapy, and has been used before, during, and after chemotherapy in susceptible cancers. Radiotherapy has an important role in palliation of symptoms (such as pain, bleeding, obstruction and tumour ulceration) in patients no longer considered curable. Overall, it is estimated that about half of all patients with cancer will require radiation at some point in their cancer journey.

Purpose of the Residency Programme

The Radiation Oncology Residency Programme is designed to produce competent and well-qualified Radiation Oncologists to serve the needs of Singapore. They will collaborate with a multi-disciplinary team to ensure successful delivery of treatment to ensure the best outcome for patients.

Admission Requirements

At the point of application for this residency programme,

- a) Applicants must be employed by employers endorsed by Ministry of Health (MOH); and
- b) Residents who wish to switch to this residency programme must have waited at least one year between resignation from his / her previous residency programme and application for this residency programme.

At the point of entry to this residency programme, residents must have fulfilled the following requirements:

- a) Hold a local medical degree or a primary medical qualification registrable under the Medical Registration Act (Second Schedule);
- b) Have completed Post-Graduate Year 1 (PGY1);
- c) Have a valid Conditional or Full Registration with Singapore Medical Council (SMC); and
- d) Have completed at least 12 months of non-Radiation Oncology rotations at the Medical Officer level, with at least 6 months in the core specialties listed below.

Medical specialties

1. General Medicine
2. Medical Oncology
3. Geriatric Medicine
4. Gastroenterology
5. Respiratory Medicine
6. Haematology
7. Palliative Medicine
8. Paediatric Medicine

Surgical Specialties

1. General Surgery
2. Urology
3. Cardiothoracic Surgery
4. Neurosurgery
5. ENT
6. O&G

Each core specialty rotation should be at least 3 months long.

Selection Procedures

Applicants must apply for the programme through the annual residency intake matching exercise conducted by MOH Holdings (MOHH).

Continuity plan: Selection should be conducted via a virtual platform in the event of a protracted outbreak whereby face-to-face on-site meeting is disallowed and cross institution movement is restricted.

Less Than Full Time Training

Less than full time training is not allowed. Exceptions may be granted by Specialist Accreditation Board (SAB) on a case-by-case basis.

Non-traditional Training Route

The programme should only consider the application for mid-stream entry to residency training by an International Medical Graduates (IMG) if he / she meets the following criteria:

- a) He / she is an existing resident or specialist trainee in the United States, Australia, New Zealand, Canada, United Kingdom and Hong Kong, or in other centres / countries where training may be recognised by the Specialist Accreditation Board (SAB); and
- b) His / her years of training are assessed to be equivalent to the local training by JCST and / or SAB.

Applicants may enter residency training at the appropriate year of training as determined by the Programme Director and RAC. The latest point of entry into residency for these applicants is Year 1 of the senior residency phase.

Separation

The PD must verify residency training for all residents within 30 days from the point of notification for residents' separation / exit, including residents who did not complete the programme.

Duration of Residency Programme

The training duration must be 60 months, comprising of 36 months of junior residency and 24 months of senior residency.

Maximum candidature: All residents must complete the training requirements, requisite examinations and obtain their exit certification from JCST not more than 36 months beyond the usual length of their training programme. The total candidature for Radiation Oncology is 60 months Radiation Oncology residency + 36 months candidature.

“Make-up” Training

“Make-up” training must be arranged when residents

- Exceed days of allowable leave of absence / duration away from training or
- Fail to make satisfactory progress in training.

The duration of make-up training should be decided by the JCC¹ and should depend on the duration away from training and / or the time deemed necessary for remediation in areas of deficiency. The JCC should review residents’ progress at the end of the “make-up” training period and decide if further training is needed.

Any shortfall in core training requirements must be made up by the stipulated training year and/or before completion of residency training.

Learning Outcomes: Entrustable Professional Activities (EPAs)

Residents must achieve level 4 of the following EPAs by the end of residency training:

	Title
EPA 1	Conducting first visit consultations
EPA 2	Approving radiotherapy plans
EPA 3	Managing treatment toxicity and response during radiotherapy
EPA 4	Conducting follow-up clinics for surveillance post-radiotherapy

Core Competencies, Sub-competencies and Milestones

The programme must integrate the following competencies into the curriculum, and structure the curriculum to support resident attainment of these competencies in the local context.

Residents must demonstrate the following core competencies:

1) Patient Care and Procedural Skills

Residents must demonstrate the ability to:

¹ The JCC is established for Integrated Programmes (IPs) to oversee resident selection, training curriculum, and faculty and resident evaluations.

- Gather essential and accurate information about the patient
- Counsel patients and family members
- Make informed diagnostic and therapeutic decisions
- Prescribe and perform essential medical procedures
- Provide effective, compassionate and appropriate health management, maintenance, and prevention guidance

Residents must demonstrate the ability to:

- Make informed diagnostic and therapeutic decisions with respect to oncology treatment in radiotherapy
- Take an informed consent for radiotherapy treatment

Residents must demonstrate necessary radiotherapy technical skills in the domains of:

- Reading Diagnostic Images
- Contouring Organs at Risk
- Contouring Targets
- Image Fusion
- Plan Evaluation
- Treatment Techniques
- Weighing Radiotherapy Tradeoffs
- Treatment Image Verification

2) Medical Knowledge

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioural sciences, as well as the application of this knowledge to patient care.

Residents must develop a deep and comprehensive understanding of the clinical, epidemiological, and social-behavioural sciences as they specifically relate to the diagnosis, treatment, and management of cancer using radiation therapy. They must integrate this knowledge with practical skills to deliver safe, effective, and personalized care to patients with malignancies.

Residents must demonstrate knowledge in the following areas:

- **Cancer Biology and Disease Processes**
 - molecular and cellular biology of cancer, including tumorigenesis, cancer genetics, tumour microenvironment, and mechanisms of metastasis
 - natural history and clinical behaviour of various malignancies, including site-specific tumour characteristics, patterns of spread, and prognostic factors
- **Evidence-Based Radiation Treatment Principles**
 - critical appraisal and application of current evidence supporting radiation therapy trials, including understanding indications, contraindications, and

- comparative effectiveness of different radiation modalities (e.g., external beam radiation, brachytherapy, stereotactic radiosurgery)
- clinical trial data, consensus guidelines, and emerging therapies that optimize tumour control while minimising toxicity
- combined modality treatments, such as chemoradiation
- **Radiation Physics and Dosimetry**
 - radiation physics principles as they apply to oncology, including the nature and properties of ionising radiation, radiation interactions with matter, dose distribution, fractionation schedules, and radiobiological effects on normal and malignant tissues
 - radiation dosimetry, treatment planning systems, and quality assurance processes to ensure precise and safe delivery of radiation doses
 - radiation safety standards and protocols to protect patients, staff, and the environment.

3) System-Based Practice

Residents must demonstrate the ability to:

- Work effectively in various health care delivery settings and systems relevant to their clinical specialty
- Coordinate patient care within the health care system relevant to their clinical specialty
- Incorporate considerations of cost awareness and risk/benefit analysis in patient care
- Advocate for quality patient care and optimal patient care systems
- Work in inter-professional teams to enhance patient safety and improve patient care quality. This includes effective transitions of patient care and structured patient hand-off processes.
- Participate in identifying systems errors and in implementing potential systems solutions

4) Practice-Based Learning and Improvement

Residents must demonstrate a commitment to lifelong learning.

Resident must demonstrate the ability to:

- Investigate and evaluate patient care practices
- Appraise and assimilate scientific evidence
- Improve the practice of medicine
- Identify and perform appropriate learning activities based on learning needs

5) Professionalism

Residents must demonstrate a commitment to professionalism and adherence to ethical principles including the Singapore Medical Council's Ethical Code and Ethical Guidelines (ECEG).

Residents must:

- Demonstrate professional conduct and accountability
- Demonstrate humanism and cultural proficiency
- Maintain emotional, physical and mental health, and pursue continual personal and professional growth
- Demonstrate an understanding of medical ethics and law

6) Interpersonal and Communication Skills

Residents must demonstrate ability to:

- Effectively exchange information with patients, their families and professional associates.
- Create and sustain a therapeutic relationship with patients and families
- Work effectively as a member or leader of a health care team
- Maintain accurate medical records

Other Competency: Teaching and Supervisory Skills

Residents must demonstrate ability to:

- Teach others
- Supervise others

Learning Outcomes: Others

Residents must attend Medical Ethics, Professionalism and Health Law course conducted by Singapore Medical Association (SMA) and Geriatric Medicine Modular Course by Academy of Medicine Singapore (AMS).

For progression from R3 to R4, residents must successfully complete FRCR Part 1 or FRANZCR Phase 1 examination.

Curriculum

The curriculum and detailed syllabus relevant for local practice must be made available in the Residency Programme Handbook and given to the residents at the start of residency.

The PD must provide clear goals and objectives for each component of clinical experience.

Learning Methods and Approaches: Scheduled Didactic and Classroom Sessions

The Programme must schedule, and residents must attend the following:

- Didactic teaching sessions covering core subjects for the First FRCR / FRANCR which include physics, radiation & cancer biology, medical statistics, pathology (minimum attendance of 80%)
- teaching sessions on clinical oncology covering the Final FRCR / FRANZCR topics (minimum attendance of 80%)

- Audit meetings
- Journal clubs
- Multidisciplinary tumour boards

The teaching can be done face to face or done virtually.

Learning Methods and Approaches: Clinical Experiences

- Residents must be rotated to various site-specific teams over the course of their residency and residents must complete rotations to all the following sites: Head and Neck, Breast, Thorax, Gastrointestinal / Hepatobiliary, Urology, Gynaecology, Musculoskeletal / Soft tissue, Brain, and Haematological malignancies.
- During each clinical rotation, residents must participate actively in:
 - Outpatient clinics with consultant supervision to allow residents to present and discuss clinical findings and management plans with the training consultant. Residents should gain experience of managing both new and follow-up patients.
 - Radiotherapy planning sessions. Residents must receive comprehensive teaching of radiotherapy planning that is appropriate to their stage of training, including simulation, 3D conformal planning, image fusion and intensity-modulated radiotherapy (IMRT). Residents should participate in the equivalent of at least 1 radiotherapy planning session per week, and there must be opportunities to discuss treatment plans with the supervising consultant.
 - Radiotherapy treatment review clinics. Residents must gain experience in the acute and long-term complications of radiotherapy.
 - Provision of on-going clinical care for radiotherapy patients who have been admitted because of complications of disease or treatment.
- Residents' weekly schedule must contain an appropriate mix of outpatient clinics (new and follow-up), radiotherapy treatment sessions, tumour board meetings, and other appropriate clinical activities. The Chief Resident must schedule each resident to various cancer sites under the supervision of the core faculty and or program director.
- An example of an appropriate weekly schedule is as follows:
 - 3 clinic sessions
 - 3 review sessions
 - 1 planning sessions
 - 1 protected time/ learning session
 - 1 audit session
 - 1 miscellaneous session (blue letters, etc.)

(1 session = half a day or equivalent)

Learning Methods and Approaches: Scholarly / Teaching Activities

Residents are encouraged to complete the following scholarly / teaching activities.

	<i>Name of activity</i>	<i>Brief description: nature of activity, minimum number to be achieved, when it is attempted</i>
1.	<i>Poster</i>	<i>Any conference (local or international)</i>
2.	<i>Journal club</i>	<i>Article presentation and discussion</i>
3.	<i>Teaching</i>	<i>Teaching peers, juniors, undergraduates</i>
4.	<i>Publication</i>	<i>Any peer-reviewed journal</i>
5.	<i>Oral presentation</i>	<i>Any conference (local or international)</i>

Learning Methods and Approaches: Documentation of Learning

Residents must keep a representative log of the cases they see / manage for each of the following sites (minimum 10 cases for each site).

1. Thorax
2. Breast
3. Gastrointestinal tract
4. Central nervous system
5. Reproductive system
6. Head and neck
7. Lymphoma, sarcoma, paediatrics, skin, benign conditions

Summative Assessments

	Summative assessments	
	FRANZR	FRCR
R5	Phase 2 (written) Radiation Oncology: 3 papers, short answer questions (SAQs) Pathology: 1 paper, 120 minutes, 12 SAQs and 60 very short answer questions Phase 2 (oral) Planning: 6 questions of 6 minutes each Clinical cases: 10 cases of 6 minutes each	Part 2A (written) Two papers of 120 SBA questions each (5 options) Duration: 180 minutes per paper Part 2B (oral) Clinical OSCE Examination 12 assessment stations with clinical style questions.
R4	Nil	Nil
R3	Nil	Nil
R2	Phase 1 (written) 3 papers Anatomy (120 minutes) • Diagram labelling: 60 • MCQs: 30 questions • SAQs Radiation Oncology Physics (120 minutes) • MCQs: 60 questions • SAQs Radiation & Cancer Biology (120 minutes) • MCQs: 60 questions • SAQs	Part 1 (written) 4 written papers of SBA MCQs (5 item) split into 2 days Clinical Biology & Radiobiology 50 Qns (150 minutes) Clinical Pharmacology 40 Qns (120 minutes) Physics 50 Qns (150 minutes) Medical Statistics 40 Qns (120 minutes)
R1	Nil	Nil

S/ N	<u>Learning outcomes</u>	<u>Summative assessment components</u>	
		Component a: MCQ	Component d: Viva
1	EPA 1: Conducting First Visit Consultations	✓	✓
2	EPA 2: Approving radiotherapy plans	✓	✓
3	EPA 3: Managing treatment toxicity and response during radiotherapy	✓	✓
4	EPA 4: Conducting follow-up clinics for surveillance post-radiotherapy	✓	✓