Clinical Oncology Postgraduate Training in Malaysia

TRAINING CURRICULUM

VERSION 1, 2021

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PREFACE

The National Postgraduate Curriculum for Clinical Oncology Malaysia (NCCOM), is the single curriculum for postgraduate training programme in Clinical Oncology in Malaysia. It is the culmination of a collaborative effort of a team of clinical oncologists from the Ministry of Higher Education and the Ministry of Health and provides a structured and unified curriculum for the training of Clinical Oncology specialists throughout the country aligned with the national strategy for healthcare. This single standard curriculum has been developed so as to deliver consistent high quality, effective, safe and specialised cancer care across the whole of Malaysia. All Clinical Oncology training programmes in Malaysia should conform to the minimum requirements described in this document and subsequent editions when they become available.

Every care has been taken to ensure that the information in this document was accurate at the time of publication. It is anticipated that the curriculum will be reviewed and revised at regular intervals, in keeping with advancements in oncological practice. Content may not be reproduced without permission from the authors.

The authors and contributors of this curriculum were selected and supported by the Clinical Oncology Specialty Committee (COSCO). They are acknowledged below, (names are arranged in alphabetical order).

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Trainees have the option to train either through a university Master's Degree programme and take the Master of Clinical Oncology (MCO) examination, or through the Ministry of Health parallel programme and take the Fellowship of Royal College of Radiologists (FRCR) examination which is a United Kingdom (UK) examination. The selection process, syllabus and training structure are similar for both.

OVERVIEW

Specialty Introduction

Clinical Oncology is a speciality that utilises radiotherapy and systemic therapy in the management of patients with cancer. Clinical oncologists are specialists trained in delivering both radiation therapy and systemic therapy which includes chemotherapy, hormonal therapy, targeted therapy and immuno-oncology drugs. There are two other closely related specialties, namely radiation oncology and medical oncology. Radiation oncologists treat cancer using radiotherapy whereas medical oncologists use systemic therapy. Oncologists manage patients with cancer from diagnosis to treatment and further care, in close collaboration with other specialised disciplines e.g., surgery, and non-government organisations e.g., hospice groups. The aim is to provide comprehensive care and support for patients and families during an extremely difficult time in their lives.

Size of the Specialty and Pressures for Growth

There are approximately 100 oncologists practising in Malaysia (National Specialist Register, 30 June 2020). About one third are working in public hospitals which treat the majority of patients. The International Atomic Energy Agency (IAEA) recommended ratio is 10 oncologists to one million population and based on our current population of about 32 million, over 300 oncologists are required. The demand is likely to increase with population expansion, an aging society and increasing incidence of cancer secondary to lifestyle change. There is a large shortfall both in the number of oncologists as well as in the demographics of where they are practising. As the concentration of oncologists is in urban hospitals, remote areas are often not being directly served and access to care is limited. There is an urgent need to increase the number of oncologists and widen the coverage so as to provide better care across Malaysia. The country also needs more oncologists who will serve as future trainers and thinkers to keep expanding and developing the specialty.

Why Choose Clinical Oncology as a Career

Receiving a cancer diagnosis often causes fear and anxiety which significantly affects patients' psychosocial well-being and often has a large impact on their family, social, and occupational environments. A good and caring oncologist can often make a difference in patients' lives even when a cure may not be the goal. The doctor-patient relationship formed is usually much deeper than in many other specialties. Oncologists find themselves educating and empowering their patients to make informed choices concerning their own care. They spend a considerable amount of time addressing issues which can be emotionally challenging and are required to interact with patients with compassion whilst delivering the best possible outcome. Doctors who are passionate about making a difference will find this aspect of the specialty very motivating and satisfying. It is extremely rewarding to care for patients whom others may have given up hope on.

Rapidly advancing technologies in Clinical Oncology, as well as research breakthroughs require the oncologists to keep up-to-date with progress, making it an exciting continuous life-long learning experience. It is essential for oncologists to keep abreast of the latest advancements in oncology, as changes in the management of cancer are quite common. This specialty provides the opportunity to develop clinical and scientific skills and has the potential for academic and research opportunities.

If you like the personal interaction with patients and families, welcome the challenge of formulating individual treatment plans, have an interest in clinical research, and enjoy working in a team, then Clinical Oncology is the specialty for you. This is one discipline in which the doctor has the opportunity to 'touch a patient's life'.

Unique Features of the Specialty

Comprehensive care, 720-degree patient care

Oncology deals with all aspects of the patient's treatment (360°) but unlike many specialties, it also offers care for the remaining lives of patients and their families (720°). Many patients perceive themselves to be incurable when they first receive their diagnosis but rapid advances in treatment modalities make cancer cure a possibility, giving much hope to these patients to achieve long-term remissions and survival.

Patient-oriented and individualised treatment

Treatment decision is tailored to the individual patient's disease and treatment factors, as well as patient's wishes, goals and social circumstances. There are often several comparable treatment options and the patient's preference is an important factor in decision-making. Consideration for the physical, social, psychological, emotional, and financial status of the patient can play a part in the overall management plan.

Multidisciplinary approach

Clinical oncologists work as a team in close collaboration with specialists in cancer care from other disciplines e.g., surgery, radiology, interventional radiology, nuclear medicine, pathology, palliative care, internal medicine, rehabilitation, anaesthesiology, etc. Within its own discipline, clinical oncologists work closely with various allied healthcare staff and professionals such as medical physicists, therapy radiographers, oncology nurses, dietitians, physiotherapists, psychologists, and social workers.

Technology-driven and fast-advancing field

The progress in oncological sciences and treatment is very rapid and is supported by very active research and advances in technology. There are continuous breakthroughs in the understanding of the underlying genomics and identification of new predictive biomarkers and therapies which improve treatment precision and outcome. The technology for radiotherapy planning and delivery is increasing in sophistication which facilitates highly accurate and safe treatment.

Advocacy

Oncologists have a key role in working with various patient advocacy groups to educate members and guide research activities. There are many support groups and non-government organisations globally that raise funds for cancer care, treatments and research. They also play important roles in actively promoting and facilitating cancer screening, in addition to providing moral and emotional support to the cancer patients and families.

Purpose

The purpose of the Clinical Oncology national curriculum is to:

1. Improve the standards and quality of training for all trainees.
2. Produce competent clinical oncologists to deliver specialised patient-centred cancer care.
3. Provide a common structure to standardise training programme throughout the country.
4. Increase the number and widen the coverage of clinical oncologists in Malaysia.

Curriculum Overview

National Postgraduate Medical Curriculum (NPMC)

The national curriculum for Clinical Oncology training in Malaysia is part of the National Postgraduate Medical Curriculum (NPMC). It is the product of a collaborative effort by members of the Curriculum Committee appointed by the Clinical Oncology Specialty Committee (COSCO), which consists of oncologists from the Ministry of Higher Education (MOHE), and the Ministry of Health (MOH).

National Postgraduate Curriculum for Clinical Oncology Malaysia (NCCOM)

The National Postgraduate Curriculum for Clinical Oncology Malaysia (NCCOM) is the common curriculum for postgraduate training programmes in Clinical Oncology in Malaysia. Trainees have the option to train either through a university Master's Degree programme and take the Master of Clinical Oncology (MCO) examination, or through the Ministry of Health parallel programme and take the Fellowship of Royal College of Radiologists (FRCR) examination which is a United Kingdom (UK) examination. The selection process, syllabus and training structure are similar for both. This single standard curriculum has been developed so as to deliver consistent high quality, effective, safe and specialised cancer care across the whole of Malaysia.

Programme Education Objectives (PEO)

Three education outcomes are shown below.

PEO 1	Deliver effective, safe, person-centred and value-based care by applying evidence-informed medical knowledge and clinical skills to solve problem, manage and coordinate cancer care.
PEO 2	Demonstrate ethical conduct, professionalism, and commitment towards personal development and lifelong learning.
PEO 3	Be leaders in the Clinical Oncology field and contribute to education, research and the promotion and improvement of health in the local, national and international settings.

Programme Learning Outcomes (PLO)

There are eight learning outcomes for the programme. These are shown below.

PLO 1	**Demonstrate** a comprehensive and systematic approach to solve complex and current healthcare issues using medical knowledge, concepts and principles to provide safe, effective and evidence-based patient care. **Corresponds to MQF Cluster 1: Knowledge and Understanding**
PLO 2	**Contribute** substantially to the area of specialisation through the creation of new knowledge/ theories/ solutions/ practice through originality and independent research, which satisfies peer reviews and international standards. **Correspond to MQF Cluster 2: Cognitive Skills**
PLO 3	**Demonstrate** competency in practical and technical skills in relevant areas of specialisation and continually develop new skills and techniques to resolve emerging problems in Clinical Oncology. **Corresponds to MQF Cluster 3: Functional Work Skills – Practical Skills**
PLO 4	**Communicate** effectively, ethically and professionally with all stakeholders including patients, peers, members of the care team and the community at large. **Corresponds to MQF Cluster 3: Functional Work Skills – Interpersonal and Communication Skills**
PLO 5	**Apply** existing technological tools effectively to enhance patient care and undertake research to improve practice. **Corresponds to MQF Cluster 3: Functional Work Skills – Digital and Numeracy Skills**
PLO 6	**Demonstrate** leadership, autonomy and advocacy in contributing to decision-making practices for patient management, training, research and health systems improvement in Clinical Oncology. **Corresponds to MQF Cluster 3: Functional Work Skills – Leadership, Autonomy and Responsibility Skills**
PLO 7	**Continually** integrate new knowledge in the area of specialisation for personal advancement and lifelong learning through ongoing academic and/or professional development. **Corresponds to MQF Cluster 4: Personal and Entrepreneurial Skills**
PLO 8	**Demonstrate** commitment to professional values, attitudes and ethical conduct in patient management and research in Clinical Oncology. **Corresponds to MQF Cluster 5: Ethics and Professionalism**

Entry Criteria

The entry requirements are detailed in the Selection and Recruitment Section. Candidates are required to have a minimum of two years post-housemanship clinical experience which must include a minimum of six months in medicine **AND** a minimum of six months in surgery, with active medical and surgical on-call. This is required to attain the minimum clinical competency prior to entry into training. The evidence for this minimum level of clinical competency is based on entry level Essential Learning Activities (ELAs). This is described in the Selection and Recruitment Section. While experience in oncology is not a requirement for entry into Clinical Oncology training, it is encouraged.

Training Pathways

There are two pathways for attaining the qualification as a specialist in Clinical Oncology; the MCO pathway, a degree through the Ministry of Higher Education (MOHE), and the FRCR pathway, a qualification through the Ministry of Health (MOH) parallel pathway. The NCCOM integrates both pathways within a single curriculum and except for the examinations, the content and features of training are aligned. The entry requirements, entry process, syllabus, training format, assessment tools and exit criteria are similar for both. The structure of training is illustrated in Figure 1.

Training for the MCO pathway is conducted completely locally in Malaysia. Trainees in the FRCR pathway who have completed at least two years local training and passed the first FRCR Examination may continue training in selected UK centres for a minimum of two years, under scholarships from ‘Bahagian Pengurusan Latihan’ (BPL), MOH. Both pathways require a minimum training duration of four years, with the maximum being seven years.

NATIONAL POSTGRADUATE MEDICAL CURRICULUM IN CLINICAL ONCOLOGY

Entry Criteria

- Bachelor of Medicine & Surgery or similar qualifications
- Registered with Malaysian Medical Council (MMC)
- Certificate in Medical Specialist Pre-Entrance Examination (MedEx), MRCP or similar qualifications
- Minimum two years of post-housemanship training (includes medical & surgical disciplines)
- Absence of disciplinary action
- Entrance evaluation

Application to National Postgraduate Curriculum for Clinical Oncology Malaysia (NCCOM)

MCO

MCO Part One Examination
(at the end of Year 1)

- Basic Sciences

MCO Part Two Examination
(at the end of Year 3)

- Tumour Sites

Final Examination

- Research Project
- Training Progress

Programme Exit

Clinical Rotation at MOHE & MOH Accredited Training Centres

Basic Sciences (Year 1)
Tumour Sites (Years 1-4)
Therapy & Skills (Years 1-4)
Research Project (Years 1-4)

Lectures
Clinical teaching
Self-study

Workplace-Based Assessments

- CBDs, IBAs, logbooks
- Clinical attachment appraisal
- Research progress report
- Annual review
- Essential courses

Exit Committee Review

Gazettement

FRCR

First FRCR Examination (Part One)
(at the end of Year 1)

- Basic Sciences

Final FRCR Examination (Part Two)
(at the end of Year 3)

- Final FRCR Part A
- Final FRCR Part B

Final Examination

- Research Project
- Training Progress

Programme Exit

Full-fledged Clinical Oncologist

Figure 1: Clinical Oncology training structure integrating the MCO and FRCR pathways.

Phases of Training

The training is made up of two stages which correspond to Years 1 to 4. In Year 1, trainees learn the basic science subjects which underpin the essential basic knowledge. Clinical training occurs throughout the four years in order to develop increasing levels of competency in the management of tumour sites using various therapy and skills. Trainees also need to carry out a research project throughout the four years. This is summarised in Table 1.

Table 1: Phases of training in Clinical Oncology curriculum

Stages	Years	Description	Assessments*
Pre-Entry	**0**	Prior to entry into training.	**Entrance Evaluation**
STAGE 1	**Year 1**	Teaching in basic sciences subjects – anatomy, cancer biology, cancer pathology, medical statistics, pharmacology, radiobiology and radiotherapy physics. Clinical teaching and training with various assessment tools* to cover all aspects of non-surgical cancer treatment, primarily radiotherapy and systemic therapy. Workplace-based assessments and documentation in logbooks of the procedures and clinical skills undertaken will be carried out throughout the whole duration of the training programme.	**Continuous Assessments** **MCO Part One Examination** **First FRCR Examination**
STAGE 2	**Year 2** **Year 3**	Conduct research project. Clinical teaching and training with various assessment tools* to cover all aspects of non-surgical cancer treatment, primarily radiotherapy and systemic therapy. Workplace-based assessments and documentation in logbooks of the procedures and clinical skills undertaken will be carried out throughout the whole duration of the training programme.	**Continuous Assessments** **MCO Part Two Examination** **Final FRCR Examination**
	Year 4	Continue with clinical training and assessments. Submission of workplace-based assessment forms and research project report.	**Continuous Assessments** **Final Examination**

*Refer to Tables 24-26 in the Assessments Section for the tools and their timelines.

Key Stage Points

For MCO, the whole training programme is undertaken locally. Trainees undergo six-monthly clinical rotations at the accredited training centres in both MOH and MOHE hospitals. Workplace-based assessments are scheduled throughout the training, primarily using tools such as case-based discussions (CBD), intervention-based assessment (IBA), logbook and clinical attachment appraisals (CAA). An annual review is scheduled at the end of each year to monitor trainees' progress. Trainees are expected to start their research project at the beginning of Year 2 and submit the research report for the Final Examination. There are three major Examinations throughout the four years of training; Part One, Part Two and Final Examinations. These are described further in the Assessments Section.

For trainees in FRCR pathway, initial training is carried out locally for up to two years followed by an overseas placement in the United Kingdom for the remaining two years. Workplace-based assessments are similar to those of MCO pathway. Trainees sit for the FRCR Examinations consisting of First and Final FRCR Examinations, which are considered to be at similar level to MCO Part One and Part Two Examinations. The Final Examination is the same for both pathways. The research project must be completed within the four years of training period and submitted prior to sitting the Final Examination.

Exit Criteria

In order to obtain a certificate of completion of training, trainees must fulfil the specified exit criteria. Each trainee's progress is reviewed by the Exit Committee to confirm fulfilment of all the criteria.

The exit criteria* are summarised below.

1. Complete the minimum training duration of four years
2. Pass all the required examinations
3. Achieve a satisfactory level in all workplace-based assessments
4. Demonstrate good general conduct

*Refer to Table 30 in the Exit Criteria Section for the exit criteria to be fulfilled by trainees at the end of training.

SELECTION AND RECRUITMENT

Entry Requirements

Candidates are expected to meet the essential requirements of the programme. They are divided into qualifications and professional experience.

Qualifications

1. Bachelor of Medicine, Bachelor of Surgery or similar qualification
2. Registered with Malaysian Medical Council as per Medical Act 1971
3. Possess a valid certificate for Medical Specialist Pre-Entrance Examination (MedEX) or MRCP or similar qualification

Professional Experience

Candidates are required to have a minimum of two years post-housemanship experience. The two years must include a minimum of six months in medicine **AND** a minimum of six months in surgery, with active medical and surgical on call. This must be within five years from the point of entry. This is required to attain the minimum clinical competency prior to entry into training. Candidates must not have any disciplinary issues. While experience in oncology is not a requirement for entry into Clinical Oncology training, it is encouraged.

Entrance Evaluation

Applicants that meet the above requirements will be called to sit for an entrance evaluation. This is performed via Objective Structured Clinical Examination (OSCE) in order to evaluate the candidates' clinical competency. The evidence of minimum clinical competency is evaluated based on the entry level Essential Learning Activities (ELAs).

Essential Learning Activities (ELA) – Entry Level

Entry level ELAs are clinical activities that prospective trainees should be able to perform in a trustworthy manner by the time they enter the postgraduate training in Clinical Oncology. An ELA is the identification and description of a clinical task in such a way that the trainee is fully aware of the knowledge, skills and attitudes (KSA) needed to complete the task, and the trainer is fully aware of what needs to be observed to deem the task is completed to a professional level (Frostick and Pitts, 2017). Candidates must demonstrate a minimum level of clinical competency and the knowledge, skills and attitudes required when carrying out the tasks and responsibilities. ELAs also serve as learning opportunities for trainees as they perform the tasks and receive feedback on their performance.

There are seven entry level ELAs for Clinical Oncology as listed below. Entry level ELAs are detailed in Appendix 1.

ELA 1	Assessment of a patient with cancer
ELA 2	Assessment and initial management of pain
ELA 3	Management of severe infection
ELA 4	Diagnosis and initial treatment of thromboembolic event
ELA 5	Initial management of acute upper gastrointestinal bleeding
ELA 6	Initial management of hypercalcaemia
ELA 7	Management of acute hypersensitivity reaction

Entry Process

The entry process is summarised in Table 2 below.

Table 2: Application entry process for NCCOM

	MCO Pathway	FRCR Pathway
Advertisement	Advertisement for MOH scholarship is announced on the MOH website.	Information is available at MOH oncology centres[1].
MOH applicants	Applications for study leave and MOH scholarship are made online at http://ehlp.moh.gov.my The application can be made according to the timelines stated on the website.	Application into training programme to the JLKPP[2] at each MOH oncology training centre.
Private applicants[3]	Applications are made online to the Faculty of Medicine, Universiti Malaya (UM) at http://ips.um.edu.my The application can be made according to the timelines stated on the website.	Not applicable for FRCR Pathway within NCCOM.
Short-listing of applicants[4]	Eligible applicants are notified and invited to attend the entrance evaluation. This usually occurs in the fourth quarter of the preceding year of entry.	
Entrance evaluation[4]	This is done via interview and OSCE based on the entry level ELAs. It usually takes place in the first quarter of the year of entry.	
Selection of candidates[4]	This usually occurs in the first quarter of the year of entry.	
Enrolment	Trainees must register at the university on the specified date. This usually takes place in June every year.	Trainees must register with BPP[5] MOH and at the allocated training centres on the specified date. This usually takes place in June every year.
Induction at training centres	This takes place at the beginning of training at the specified centres.	

[1]MOH oncology training centres with systemic therapy and radiotherapy facilities

[2]JLKPP 'Jawatankuasa Latihan Kepakaran' Parallel Pathway

[3]Candidates who are not under MOH sponsorship, e.g., university candidates

[4]By a joint MOHE-MOH committee

[5]BPP 'Bahagian Perkembangan Perubatan'

Advertisement

Intake into the programme occurs annually, usually in June. Advertisement calling for applicants is announced online on the MOH and universities' websites. Advertisement usually occurs around mid-year of preceding year. Enquiry can be directed to the university for the Master of Clinical Oncology (MCO) pathway and to 'Jawatankuasa Latihan Kepakaran' Parallel Pathway (JLKPP) for Clinical Oncology (MOH Parallel Pathway Committee for Clinical Oncology) for Fellowship of Royal College of Radiologists (FRCR) pathway. Advertisement for sponsorship from MOH usually occurs by mid-year of the preceding year. MOH candidates applying for the MCO pathway can direct enquiries to 'Bahagian Pengurusan Latihan' (BPL), MOH.

Application Submission

Applications for study leave and MOH scholarship for the MCO pathway are made online at http://ehlp.moh.gov.my. Applicants should check their eligibility against the specified entry requirements. Completed forms are to be submitted online before the deadline date. Submission of the application for the FRCR pathway is to the JLKPP for Clinical Oncology. Private applicants are to apply directly to the universities offering the training.

Shortlisting

The applications will be processed by the university and the MOH Parallel Pathway Committee for the MCO and FRCR pathways respectively. Applicants will be short-listed by a joint committee. Eligible applicants will be invited to attend the entrance evaluation.

Entrance Evaluation

Entrance evaluation is conducted in the first and second quarters of the year of intake, and is usually completed by about May. This evaluation takes the form of an interview and OSCE. The OSCE is based on seven entry level ELAs (refer to Appendix 1). Candidates attending the interview should bring along their Curriculum Vitae and relevant certificates.

Selection and Allocation

Candidates are selected based on their performance at the entrance evaluation. Candidates will be allocated training centres during the selection process. The training centre allocation is final.

Acceptance into Programme

Offer letters will be sent to successful candidates who must confirm their acceptance within the stipulated timeframe.

Enrolment and Induction

Candidates must register on the specified date. MCO pathway trainees are to register at the university. FRCR pathway trainees register with the 'Bahagian Perkembangan Perubatan' (BPP) at MOH. This usually takes place in June every year. The head of oncology departments and the hospital directors of respective centres are notified of the enrolment. Trainees undergo departmental induction at their allocated centres. MCO trainees undergo university induction in addition to the centre induction.

Induction Process

The Induction period is essential for familiarisation with the routines in Clinical Oncology e.g., out-patient new case clinics, out-patient follow-up clinics, chemotherapy day-care, in-patient care, radiotherapy simulation and planning sessions, radiotherapy review clinics, brachytherapy sessions and on-call duties. This period will also facilitate candidates getting to know the relevant staff and administrative officers.

An induction pack is provided to each trainee. This contains the training course file and other relevant documents e.g., national guidelines and the institute's practice guidelines. The training course file contains information regarding the training e.g., the program handbook, syllabus, attachment schedules, assessment tools and training timelines.

There are five induction themes that will be covered at the various training centres. These are outlined in Table 3.

Table 3: Induction themes and contents

Themes	Contents	
Theme 1 **Programme overview and administrative matters**	**Program overview** Program structure Syllabus Teaching schedule Assessments and examinations Clinical rotation Training timelines	**Administrative matters** Introduction to coordinators, trainers and administrative staff Rules and regulations Attendance and leaves Access to various services and facilities
Theme 2 **Work Ethics**	Good medical conduct Attitude Responsibility Accountability	Incident reporting Patient's rights and confidentiality Communication and interpersonal skills
Theme 3 **Radiotherapy**	Radiotherapy planning rooms ▪ Simulation ▪ Treatment planning system (TPS)	Radiation treatment area Brachytherapy Radiation protection
Theme 4 **Out-patient services**	**Chemotherapy day-care** Day-care workflow	**Clinic services** Clinic workflow Multidisciplinary team (MDT) ▪ Tumour board meetings ▪ Combined clinics
Theme 5 **In-patient services**	**In-patient services** Ward workflow	Infection control

QUALITY ASSURANCE AND ACCREDITATION

Statutory Bodies

Medical Education Committee, Malaysian Medical Council

The Medical Education Committee (MEC) of the Malaysian Medical Council (MMC) was formed under the provisions of Regulation 22 of the Medical (Amendment 2012) Act 1971. The MEC recognises specialties, specialty training institutions and programmes, as well as the qualifications awarded.[1]

Evaluation Committee for Specialist Medical Qualifications

The Evaluation Committee for Specialist Medical Qualifications, (ECSMQ), of the MMC, assisted by Specialty Sub-Committees (SSCs), reviews applications by applicants to be recognised as specialists.[2]

National Specialist Register (NSR)

The National Specialist Register, (NSR), is a database of specialist medical practitioners in Malaysia, formed by the MMC. Following the enforcement of the Medical Regulations 2017 of the Medical Act 1971, (Amendment 2012), in July 2017, all doctors wishing to practise as specialists in Malaysia must be registered with the NSR. Applications are reviewed by the ECSMQ.[2]

Malaysian Qualifications Agency (MQA)

The Malaysian Qualifications Agency (MQA) was formed in 2007 by the merging of the National Accreditation Board (LAN) and the Quality Assurance Division of the Ministry of Higher Education (QAD). It is governed by the Malaysian Qualifications Agency Act 2007. The MQA is in place to quality-assure higher education institutions and programmes, benchmarked against the Malaysian Qualifications Framework (MQF).[3]

Recognition of New Specialties

Proposals for new specialties, defined as those not in existence prior to 1 July 2017, must be submitted to the MEC for review, and they will make the recommendation to MMC for provisional approval.[1] Strong justification must be provided, including the rationale, relevance, demand, capacity for training, and absence of overlap with existing specialties.

Following provisional approval, the MEC will form a Specialty Education Sub-Committee to develop the specialty specific standards, propose training competencies, and recognise training centres. Clinical Oncology is a recognised specialty.

Accreditation of Programmes

MMC recognises training programmes on the recommendation of MEC. Accreditation of programmes is benchmarked against the Malaysian Standards for Specialist Training of the MMC (see the Compliance and Mapping Section). Programmes with degrees awarded by Malaysian institutions of higher education must also be accredited by MQA, based on the MQF.

Re-Accreditation of Programmes

Programmes must apply to MMC, (and MQA, if run by institutes of higher education), for re-accreditation every five years, or as determined by the accrediting body.

Quality Assurance of Programmes

Quality assurance is the process by which meeting and maintaining the desired level performance is ensured. It is a continuous process, and occurs at multiple levels, through many activities. These activities culminate in the curriculum review, which takes place every five years. Curricula are reviewed for compliance to standards, relevance and currency, taking input from all stakeholders.

In Clinical Oncology, review of curricula occurs at an institutional and national level. Each institution must satisfy its own internal quality assurance processes. National reviews are conducted by the Clinical Oncology Specialty Committee (COSCO) to ensure the alignment and standardisation of all programmes. Table 4 shows the accreditation and quality assurance requirements.

Table 4: Accreditation and Quality Assurance of Clinical Oncology programmes

<table>
<tr><th colspan="2">Accreditation</th><th>Quality Assurance</th></tr>
<tr><th colspan="2">MMC</th><th>MQA (MQF)</th></tr>
<tr><td colspan="2">MEC (National Standards)</td><td>Joint Postgraduate Committee</td></tr>
<tr><td colspan="2">National Curriculum – Clinical Oncology</td><td>Curriculum Review</td></tr>
<tr><td>Institutional QA</td><td>Conjoint Board</td><td>Institutional QA</td></tr>
<tr><td colspan="3">Programmes</td></tr>
</table>

Accreditation of Individuals

Trainers

Trainers must be recognised specialists on the National Specialist Register. Trainers must be appointed by the institution offering the programme, based on the requirements of the curriculum, (refer to Contributors Section).

Trainees

Trainees must be credentialed and privileged to perform clinical activities in their training centres. They will need to provide evidence of a recognised undergraduate medical qualification, full registration with MMC, and acceptance into the training programme. Some hospitals may also require a letter of good standing from the MMC. Referees will be required to provide testimony of trainees' performance and character.

Specialists

Trainees who successfully exit training must apply to the NSR to be recognised as specialists, at a minimum of one year after exit. During this interim period, they may be privileged to function as a specialist by their hospitals.

Specialists registered in the NSR must renew their registration every five years, or as determined by NSR. Specialists must also renew credentialing and privileging rights at their workplace, at the intervals determined by their hospitals.

External Experience

Trainees may occasionally undertake part of their oncological training outside of Malaysia. Any such training experience requires review by the COSCO to determine its relevance within the Malaysian training programme.

External Qualifications

External qualifications are those conferred by overseas awarding bodies. Qualifications may be at entry or exit level. Training for these qualifications may have taken place in, or outside of Malaysia.

Any training and qualifications at entry level, outside of those stated in this document, require review by the COSCO, and approval at institutional level.

Training and qualifications at exit level must be reviewed by the ECSMQ, to determine if criteria for registration in the NSR have been met.

References:

[1]Specialty Education Committee of the Malaysian Medical Council (2020). Guidelines for the Recognition of New and Existing Specialties by the Malaysian Medical Council. Updated 26 February 2020.

https://mmc.gov.my/wp-content/uploads/2020/03/26-Feb-2020-Guidelines-For-The-Recognition-Of-A-New-Existing-Medical-Specialty-By-Malaysian-Medical-Council-Approved-by-Council-on-16-July-2019.pdf

[2]*https://www.nsr.org.my/About-NSR.html*

[3]*https://www.mqa.gov.my/pv4/profil_MQA.cfm*

CONTRIBUTORS

Administrative and Governance

National level

At the national level, the bodies that administer and govern postgraduate training for Clinical Oncology are the Ministry of Higher Education and the Ministry of Health of Malaysia.

Ministry of Health, Malaysia (MOH)

The Parallel Pathway Programme is governed by the 'Bahagian Perkembangan Perubatan' MOH. The funding for training of MOH candidates in both Masters of Clinical Oncology and Parallel Pathway Programme comes from 'Bahagian Pengurusan Latihan' MOH.

Ministry of Higher Education, Malaysia (MOHE)

The Ministry of Higher Education, (MOHE), is the ministry of the Government of Malaysia responsible for the quality of education, policies, quality, training and research at a higher education level. All Malaysian universities are under the governance of MOHE.

Universiti Malaya (UM)

Universiti Malaya (UM) has an ongoing lead role in the development and future review of the National Curriculum with the support and contribution from the oncology counterparts in the MOH and other universities.

Organisation Level

Malaysian Qualifications Agency (MQA)

The role of the MQA is to implement the Malaysian Qualifications Framework (MQF) as a basis for the quality assurance of higher education and as a reference point for the criteria and standards of national qualifications. The MQA is also responsible for monitoring and overseeing the quality assurance practices and accreditation of national higher education.

Clinical Oncology Specialty Committee (COSCO)

COSCO is the chief governing body for Clinical Oncology training. The committee members are oncologists from the major stakeholders e.g., universities and Ministry of Health hospitals that are involved in training, and with representatives from the Academy of Medicine and private hospitals. They are appointed by the Programme Director. COSCO is responsible to the Dean of Faculty of Medicine, Universiti Malaya. The Deputy Dean of Postgraduate Studies of Faculty of Medicine is responsible for the overall running of the programme. The university awards the degree by approval of the Senate of the university.

'Jawatankuasa Latihan Kepakaran' Parallel Pathway (JLKPP) for Clinical Oncology

The committee is appointed by Ministry of Health with the main task of governing the FRCR training pathway. The committee is made up of clinical oncologists from various MOH centres.

Programme Director

The role of Programme Director is to ensure that the direction of the programme meets the structure and training objectives and facilitates high-quality learning opportunities. This position is usually held by the Head of Oncology and the appointment is determined by the university.

Programme Coordinator

The Programme Coordinators are responsible for supervising the national curriculum and are the key persons who will organise and coordinate all training-related activities. They are appointed by the university.

Trainer

Trainers are primarily oncologists, (clinical, medical and radiation), medical physicists, therapy radiographers and nurses. In addition, surgeons and physicians, pathologists, radiologists, palliative care physicians, statisticians and other allied health care professionals may be involved as trainers. Formal appointments of trainers are only required for oncologists.

Trainers are appointed by the secretariat and university based on but not limited to the criteria listed below:

1. Professional qualification
2. Post qualification working experience
3. Credentialing and privileging status at current workplace

Duties and responsibilities of trainers

Trainers undergo training with the objective of preparing them to instruct a trainee's development at all knowledge, competency and skill levels throughout the programme.

The role and responsibilities of trainers are as follows:

1. Understand the training curriculum in order to facilitate the development of the trainee's learning objectives and evaluation requirements.
2. Observe the trainee's clinical work and provide constructive and timely feedback to reinforce good practice, identify areas for improvement and enable the trainee to evaluate their own performance and progress.
3. Arrange one-to-one meetings to discuss the trainee's duties and responsibilities as well as setting the training plan throughout the duration of posting including the attendance, work/activity schedule and leave.
4. Review the trainee's previous assessment so as to set proper goals for current posting.
5. Conduct evaluations at the end of the clinical posting and annual progress for the trainees within the stipulated timeframe.

SYLLABUS

Syllabus Overview

Introduction

Clinical Oncology encompasses a wide range of cancer treatments which include radiotherapy and systemic therapy as well as other related treatment such as supportive treatment and palliative care. The syllabus defines what will be taught and learned throughout training in Clinical Oncology. It outlines the topics and guides both trainees and trainers on what knowledge to gain, skills to acquire and the attitude and values to be nurtured. This is to facilitate optimal use of knowledge and skills so that patients with cancer can be managed effectively and efficiently in a compassionate manner.

Clinical Oncology syllabus is constructed based on the lock and key model to represent the concept of targeted therapy and precision medicine in oncology (Figure 2). There are three modules; Basic Sciences, Therapy and Skills and at the centre of the lock and key model are the Tumour Sites. This reflects the focus of the syllabus as the management of oncology patients is fundamentally based on the types of cancer. In order to provide optimal patient care based on the tumour sites, solid and detailed knowledge in basic sciences, and adequate competency in the essential therapy and skills are of paramount importance. This is crucial to ensure a good fit to the management of cancer based on tumour sites.

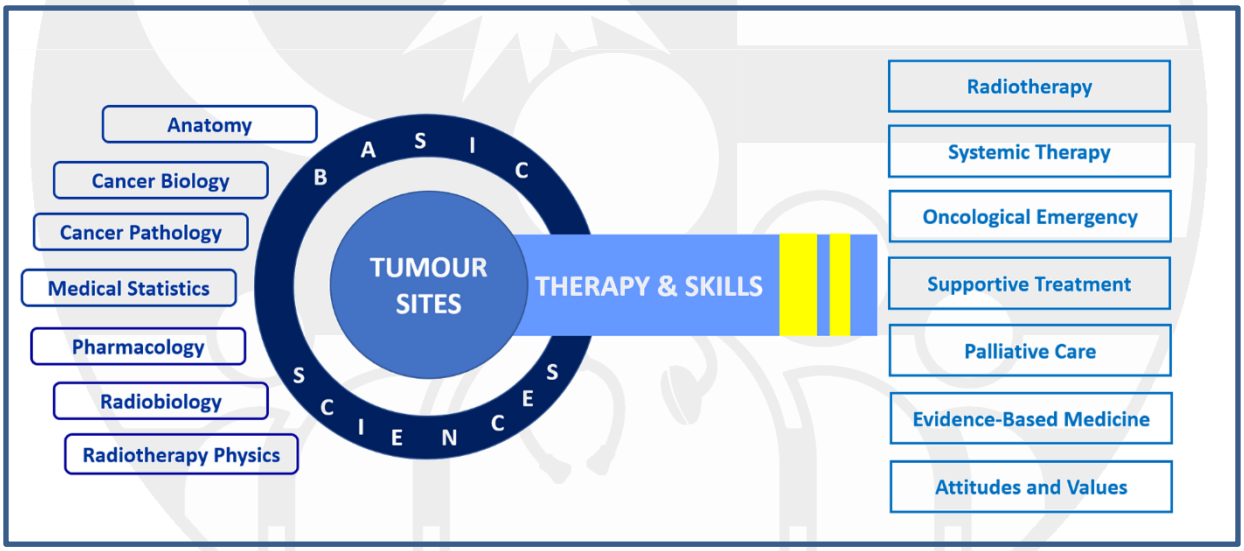


Figure 2: Lock and Key Model.

Each module is made up of various subjects in order to facilitate structured teaching and learning focusing on competence-based progress that can be assessed in formative and summative formats during training.

Basic Sciences form the first module. They are the core knowledge relevant to the practices of Clinical Oncology that comprises seven subjects; anatomy, cancer biology, cancer pathology, medical statistics, pharmacology, radiobiology, and radiotherapy physics.

Therapy and Skills module comprises the essential knowledge and skills required in oncology care. They are divided into seven subjects which include; radiotherapy, systemic therapy, oncological emergency, supportive treatment, palliative care, evidence-based medicine and attitudes and values.

The third module is the Tumour Sites module. Treatment of cancer is individualised based on sites of tumour followed by other factors such as treatment factors, patient factors and tumour characteristics. Tumour Sites module is divided into two subjects - the common tumours and the less common tumours, based on the prevalence and incidence of the various tumour types in Malaysia and the tumour types which are mainly managed by clinical oncologists. The modules and subjects are shown in Figure 3.

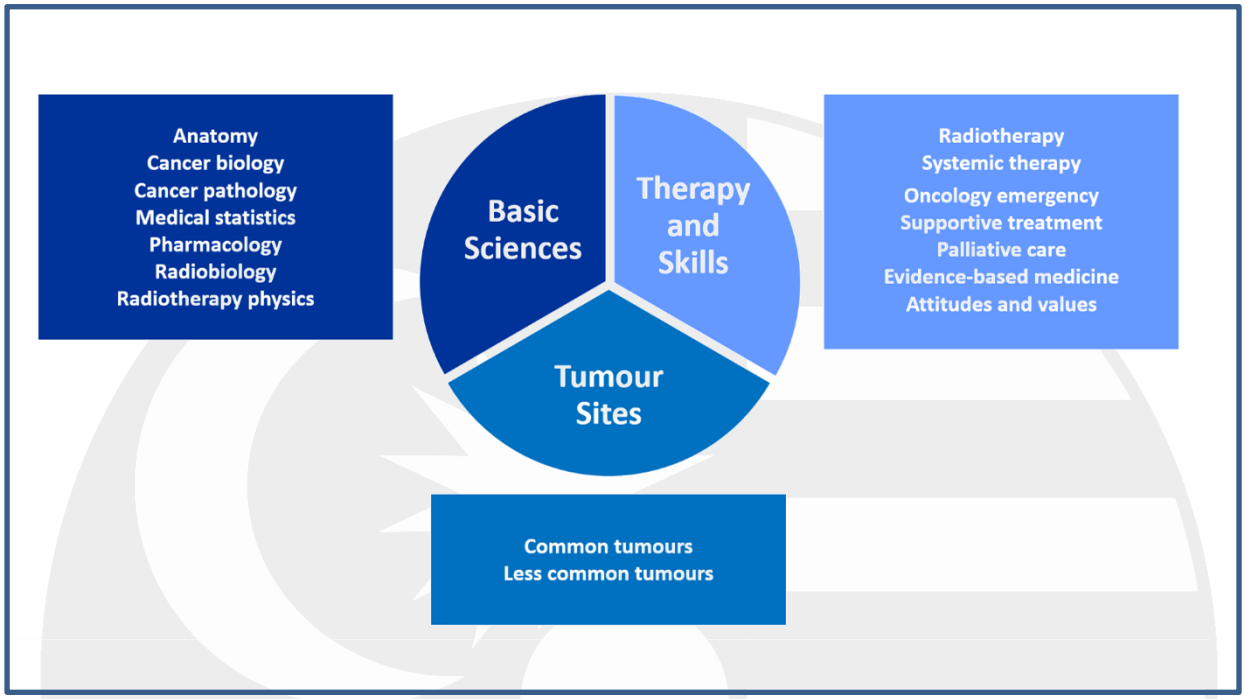


Figure 3: Modules and subjects in Clinical Oncology syllabus.

Competence level

Throughout training, trainees are expected to attain the required level of competency in the respective modules, in terms of knowledge, skills and attitudes and values which will progressively increase as they advance through the programme. Competence level describes the levels that are expected of trainees at every stage of the programme, and are defined to help trainees progress and guide trainers to confirm progress objectively. The Basic Sciences module has knowledge levels only. The Tumour Sites and Therapy and Skills modules have both defined knowledge and skill levels.

In order to help trainees monitor and assess their progress, levels of competency are defined and graded from level one to six. Table 5 describes the competence levels for both knowledge and skills. The competence description for each level is provided for the modules and topics as guidance to trainees and trainers as shown in Tables 6A-E. More examples can be found in Appendix 2: Knowledge and Skill Competence Level.

Table 5: Knowledge and skill level definition

Level	Knowledge Level Definition	Skill Level Definition
1	No specific knowledge	No specific experience expected
2	Knows of	Has observed or knows of
3	Knows basic concepts	Can manage part or parts with assistance
4	Knows generally	Can manage whole but may need assistance
5	Knows the specifics of diagnosis, subtypes and treatment options	Able to manage without assistance including potential common complications
6	Knows specifically and broadly	Able to manage complex cases and their associated potential complications

Tables 6A-E: Examples of knowledge and skills competence levels in various subjects

6A		
Level	**Radiobiology – Fractionation**	**Knowledge**
1	Awareness of radiation fractionation	
2	Knows of various fractionation regimes for different indications	
3	Understands the principles of fractionation	
4	Understands the rationale of altered fractionation regimes	
5	Selects the correct formula for application. Applies knowledge of fractionation to clinical situations appropriately	
6	Knows how to calculate to compensate dose for missed treatment, error in treatment, retreatment, biologically equivalent protocols	
6B		
Level	**Tumour Site – Breast Cancer**	**Knowledge**
1	Has general knowledge of signs & symptoms	
2	Knows diagnostic, staging work up and classification	
3	Knows treatment options – systemic therapy, radiotherapy and other therapies	
4	Understands treatment indications and toxicity management	
5	Knows individual patient management, prognosis and treatment outcomes	
6	Knows how to management of complex and rare situations, advanced techniques, emerging therapies	

6C		
Level	**Tumour Site – Breast Cancer**	**Skills**
1	Able to elicit symptoms and signs	
2	Able to assess disease extent and patient fitness for treatment Able to interpret relevant documents and investigation results	
3	Able to formulate initial treatment options Able to take consent for treatment	
4	Able to discuss treatment details and toxicities Able to implements treatment as prescribed	
5	Able to make decision on treatment Able to plan and execute treatment Can verify radiotherapy treatment Able to assess and manage treatment toxicities Able to assess treatment response	
6	Can manage complex situations e.g. recurrences, re-irradiation independently or with minimal support	

6D		
Level	**Oncology Emergency – Febrile Neutropenia**	**Knowledge**
1	Knows clinical signs and symptoms	
2	Knows the pathophysiology	
3	Knows patient and treatment-related risk factors	
4	Knows of the risk based on the various systemic therapy regimens and severity grading classification	
5	Knows how to diagnose, investigate, assess severity and treat including the use of antibiotics, granulocyte colony-stimulating factor, (GCSF) and other supportive treatment. Knows local antibiotic guidelines	
6	Knows how to manage complex cases including when to escalate care	

6E		
Level	**Oncology Emergency – Febrile Neutropenia**	**Skills**
1	Demonstrate skills in eliciting symptoms and signs	
2	Able to diagnose	
3	Able to assess severity and arrange investigations	
4	Conducts prompt initial treatment	
5	Able to manage patients comprehensively Able to assess risks for complications and monitor appropriately	
6	Can manage complex situations and escalate care appropriately Makes plans for preventive measures to reduce risks of future occurrence	

Basic Sciences

Basic sciences are considered as core knowledge and are required so as to understand and apply the various oncology treatments and care. They include seven subjects:

1. Anatomy
2. Cancer biology
3. Cancer pathology
4. Medical statistics
5. Pharmacology
6. Radiobiology
7. Radiotherapy physics.

Anatomy

It is essential to attain a detailed knowledge of general and radiological anatomy for the treatment of cancer using radiotherapy. This is used to assess disease extent, treatment response and plan radiotherapy treatment. For radiotherapy, an oncologists need to know where to contour tumour, potential areas of spread as well as the surrounding normal organs, where to place the radiation fields and doses for effective and safe radiotherapy. In contrast as surgeon, an oncologist 'cuts' using radiation with the aid of the knowledge in anatomy.

An example of competence level definition for anatomy can be found in Appendix 2.

Table 7 shows competence levels to be achieved at each year of training.

Table 7: Anatomy competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Central nervous system	2	4	5	6	6
Head and neck	2	4	5	6	6
Thorax	2	4	5	6	6
Breast	2	4	5	6	6
Endocrine organs	1	4	5	6	6
Stomach and oesophagus	2	4	5	6	6
Colon, rectum, anus	2	4	5	6	6
Hepatobiliary system	1	4	5	6	6
Genitourinary tract	2	4	5	6	6
Gynaecological organs	2	4	5	6	6
Musculoskeletal system	1	4	5	6	6
Haematological system	1	4	5	6	6
Skin	1	4	5	6	6
Paediatric tumours	1	4	5	6	6

Cancer biology

Cancer biology describes how tumours develop, grow, survive and spread. In this module, trainees learn about carcinogenesis and hallmarks of cancer, and how these are exploited in cancer therapy. From the knowledge learned, trainees are able to understand how cancers behave and how treatment works. It also enables trainees in applying innovative diagnostic and therapeutic measures in their future work. Trainees are expected to keep up-to-date with new developments as cancer biology is a dynamically evolving field.

An example of competence level definition for cancer biology can be found in Appendix 2.

Table 8 shows competence levels to be achieved at each year of training.

Table 8: Cancer biology competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Cell cycle	2	6	6	6	6
Carcinogenesis Mutation and repair Chemical, viral and radiation Genetic predisposition to cancer	2	6	6	6	6
Familial cancer syndromes	1	6	6	6	6
Biology of tumour growth Hallmarks of cancer Tumour microenvironment & host interactions Tumour vasculature & angiogenesis Invasion & metastases Cancer metabolism & metabolic pathways Cancer stem cells	1	6	6	6	6
Cellular signalling pathways Growth factors and receptors Oncogenes and tumour suppressor genes Signalling pathways in cancer	1	6	6	6	6
Cancer epigenetics	1	6	6	6	6
Telomeres and cancers	1	6	6	6	6
Gene therapy	1	6	6	6	6
Cancer immunology and immunotherapy	1	6	6	6	6
Vascular-mediated strategies	1	6	6	6	6
Mechanisms of cell death	1	6	6	6	6
Molecular techniques in cancer	1	6	6	6	6

Cancer pathology

Cancer pathology is a study of the structural, biochemical and functional changes in cells, tissues and organs that underlie cancer development and behaviour. Good knowledge of this subject enables trainees to understand the basis for pathologic confirmation of different malignancies, the microscopic and macroscopic features, immunohistochemistry and molecular profiling of tumours. Understanding the natural course and prognostic factors of the malignancies is fundamental in making treatment decisions and managing patients.

Trainees are expected to be able to discuss the demography, aetiology, pathogenesis, clinical presentation, typical macroscopic and microscopic features of common cancer, histological classification, staging of common cancers, natural history and prognosis.

An example of competence level definition for cancer pathology can be found in Appendix 2.

Table 9 shows competence levels to be achieved at each year of training.

Table 9: Cancer pathology competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Diagnosis & classification, premalignant conditions, tumour markers Pathological diagnosis of neoplastic disease, tumour classification (nomenclature) and grading Premalignant conditions Tumour markers and immunohistochemistry	2	6	6	6	6
Tumours of head & neck Orbit Oropharynx Nasopharynx Larynx Hypopharynx Oral cavity Salivary gland tumours Ear Nasal cavity Paranasal sinuses	2	6	6	6	6
Tumours of central (CNS) and peripheral nervous systems (PNS) CNS PNS	2	6	6	6	6
Thyroid	2	6	6	6	6
Tumours of the thymus	1	6	6	6	6
Tumours of the breast	2	6	6	6	6

Topics	Entry	Y1	Y2	Y3	Y4
Tumours of lung & pleura	2	6	6	6	6
Tumours of upper gastrointestinal tract Oesophagus Stomach	2	6	6	6	6
Tumours of lower gastrointestinal tract Small & large intestine Anus	2	6	6	6	6
Tumours of hepatobiliary tract Pancreas Liver Biliary tract	1	6	6	6	6
Neuroendocrine tumours	1	6	6	6	6
Gynaecological tumours Vagina and vulva Cervix Ovary Endometrium	2	6	6	6	6
Soft tissue & bone tumours	1	6	6	6	6
Tumours of genitourinary tract Kidney, ureter and urinary bladder Prostate, penis, testis	1	6	6	6	6
Haematological malignancies Non-Hodgkin lymphoma Hodgkin lymphoma Extranodal primary lymphoma Leukaemia Plasma cell dyscrasias	1	6	6	6	6
Skin malignancies	2	6	6	6	6
Paediatric tumours	1	6	6	6	6

Medical statistics

Cancer management is based on evidence. To understand the strength of medical evidence, the knowledge of medical statistics is essential as it helps trainees understand research methodology, interpret results and their clinical relevance. This enables trainees to critically review and evaluate research data. This knowledge can also be utilised to conduct one's own research.

An example of competence level definition for medical statistics can be found in Appendix 2.

Table 10 shows competence levels to be achieved at each year of training.

Table 10: Medical statistics competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Foundations on Medical Statistics Probability theory Descriptive statistics Inferential statistics Comparing means Comparing proportions ANOVA	3	5	6	6	6
Analysis of Rates and Ratios Linear regression Multiple linear regression Survival Analysis Regression for survival analysis Effect modification and confounding Logistic regression Multiple logistic regression	2	5	6	6	6
Principles and Methods of Epidemiology Epidemiology concepts Descriptive epidemiology Study design Cross sectional and ecological study Cohort study Experimental study Case control studies Measurement of risk, causation and association Errors in epidemiological studies The concept of disease transmission and disease causation	3	5	6	6	6

Topics	Entry	Y1	Y2	Y3	Y4
Measures of morbidity and mortality Standardisation Screening Epidemic investigation Principles of prevention and control Disease surveillance					
Research Methodology Research question formulation Literature search Bibliography software Study population, sampling, sample size Data collection Measurement of scales, questionnaires Processing and data analysis (SPSS, STATA) Scientific writing Scientific research article critical appraisal	2	5	6	6	6
Systematic review	2	5	6	6	6
Meta-analysis	2	5	6	6	6
Clinical studies	2	5	6	6	6

Pharmacology

Systemic therapy is one of the main treatment modalities for cancer. In this module, trainees learn the basic principles, mode of action, therapeutic doses, pharmacodynamics, pharmacokinetics and the toxicities of drugs used in oncology. This includes anti-cancer agents such as chemotherapy, endocrine therapy, targeted therapy, immunotherapy as well as supportive therapy which are used in the holistic care of cancer patients. These aspects are of prime importance in deciding treatment options, counselling patients on treatment options, and managing treatment-related side effects and complications.

An example of competence level definition for pharmacology can be found in Appendix 2.

Table 11 shows competence levels to be achieved at each year of training.

Table 11: Pharmacology competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Pharmacokinetics and Pharmacodynamics	2	6	6	6	6
Drug development	2	6	6	6	6
An overview of antineoplastic agents General classification, mechanism of action and clinical uses of cytotoxic chemotherapy Dosing, scheduling and combination of cytotoxic chemotherapy High dose chemotherapy and regional chemotherapy Dosing, scheduling and combination of cytotoxic chemotherapy	2	6	6	6	6
Alkylating agents	1	6	6	6	6
Antimetabolites	1	6	6	6	6
Antitumour antibiotics	1	6	6	6	6
Platinum compounds	1	6	6	6	6
Topoisomerase inhibitors	1	6	6	6	6
Microtubule agents	1	6	6	6	6
Miscellaneous cytotoxic agents	1	6	6	6	6
Monoclonal antibodies	1	6	6	6	6
Small molecule inhibitors	1	6	6	6	6
Immunotherapy Cytokines Immune checkpoint inhibitors Cancer vaccines	1	6	6	6	6
Hormone therapy	1	6	6	6	6
Drug resistance	1	6	6	6	6
Bone-Modifying Agents	1	6	6	6	6
Analgesics	1	6	6	6	6
Anti-emetics	1	6	6	6	6
GCSF/GMCSF and other marrow supporting agents	1	6	6	6	6
Novel agents	2	4	4	5	5

Radiobiology

Radiobiology is the study of the effects of radiation on biological systems, ranging from its effects on individual cell components to the whole organism. It is essential to acquire this knowledge for utilisation of radiotherapy which is one of the main cancer treatment modalities. In this module, trainees learn the basic principles of radiation, the physics and biology behind it as well as acute and late effects of this highly specialised treatment modality.

An example of competence level definition for radiobiology can be found in Appendix 2.

Table 12 shows competence levels to be achieved at each year of training.

Table 12: Radiobiology competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Radiation interaction with matter	2	5	6	6	6
Cellular radiobiology Growth kinetics DNA damage/repair Cell cycle Cell death Survival curves Assays Models of radiation cell killing 5Rs Dose response curves Therapeutic index	2	5	6	6	6
Oxygen effect and reoxygenation	2	6	6	6	6
Radiosensitisers and protectors	2	6	6	6	6
Radiation/chemotherapy interactions	2	6	6	6	6
Normal tissue radiobiology	2	6	6	6	6
Tumour radiobiology	2	6	6	6	6
Fractionation	2	6	6	6	6
Dose-rate effect in brachytherapy	2	6	6	6	6
High LET radiobiology	2	6	6	6	6
Prediction of radiation response	2	6	6	6	6
Whole body irradiation syndromes	2	6	6	6	6
Radiation carcinogenesis and hazards	2	5	6	6	6
Biological modifiers and novel therapy Hyperthermia Radionuclides Photodynamic therapy	2	5	6	6	6

Radiotherapy physics

Radiation therapy plays an essential role in cancer therapy. It is a curative modality in many cancer types. The objective of studying physics is for trainees to learn the principles related to radiotherapy. Trainees learn the different radiation types, dosimetry, techniques and technology involved in planning and delivering radiation as well as radiation protection principles. This is fundamental in delivering accurate and safe radiation treatment. A detailed list of the topics is shown in Appendix 3.

An example of competence level definition for radiotherapy physics can be found in Appendix 2.

Table 13 shows competence levels to be achieved at each year of training.

Table 13: Radiotherapy physics competence levels to be achieved at each year of training

Topics	Entry	Y1	Y2	Y3	Y4
Basic physics relevant to radiotherapy Structure of matter Basic radioactivity Production of x-ray Clinical radiation generators Interaction of ionising radiation Measurement of ionising radiation Measurement of absorbed dose Quality of x-ray beam Photon beam physics Electron beam physics	2	6	6	6	6
Beam therapy equipment Principles of the linear accelerator Principles of the linear accelerator Components of linear accelerators Output Concept of isocentre Beam modification devices Patient positioning and verification devices	2	6	6	6	6
Simulator equipment Principles of simulator machine Patient positioning accessories	2	6	6	6	6
External beam therapy equipment Dose distribution and scatter analysis	2	6	6	6	6
System of dosimetric calculation	2	6	6	6	6

Topics	Entry	Y1	Y2	Y3	Y4
Treatment planning	2	6	6	6	6
Patient positioning and immobilisation Image acquisition Target delineation Dosimetry planning – beam parameters, plan optimisation Plan evaluation – dose prescription guidelines, isodose distribution, dose-volume histogram (DVH) Plan and treatment verification Special situations – field matching, tissue inhomogeneity, surface obliquity Beam modifications – bolus, shielding, compensators e.g., blocks, wedges, multileaf-collimators (MLC) Digitally-reconstructed radiograph (DRR)	2	6	6	6	6
Verification	2	6	6	6	6
Brachytherapy HDR brachytherapy LDR brachytherapy Rules of implantation and dose specifications Radioactive sources Calculation of dose distribution Calibration of brachytherapy dose Systems of implant dosimetry Dose specification: Carcinoma of cervix					
Radiotherapy techniques 2D radiotherapy (2DRT) 3D conformal radiotherapy (3DCRT) Intensity modulated radiotherapy (IMRT) Stereotactic radiosurgery (SRS) Stereotactic radiotherapy (SRT) Stereotactic body radiotherapy (SBRT) Image guided radiation therapy (IGRT) Proton beam radiotherapy (PBT) Total body irradiation (TBI) Total body electron (TBE)	2	6	6	6	6

Topics	Entry	Y1	Y2	Y3	Y4
Radiation protection	2	6	6	6	6
Radiation risks Dose limits Regulations (Local Rules and IR(ME)R 2000) Classification of staff, designated areas Protection mechanisms: time, distance, shielding Personnel monitoring Treatment suite design					
Quality assurance (QA), quality control (QC) and commissioning of linear accelerator (LINAC)	2	6	6	6	6

The detailed topics can be found in Appendix 3.

Tumour Sites

Oncology management is centred on the type of tumours. Tumours may arise in various organs. Their behaviour is quite distinct and based on the sites of origin and the histological subtypes. An in-depth knowledge of the malignant diseases of each tumour site and their management is crucial in the training of a competent oncologist. The optimal management of a patient with cancer requires the combined knowledge in basic sciences and knowledge and skills in various subjects including the treatments. The Tumour Sites module comprises two subjects - common tumours and less common tumours. Table 14 summarises the various tumour sites under each subject. Each tumour site has several subsites as summarised in Table 15.

Table 14: Various tumour sites under each subject

Common Tumours (11 sites)	Less Common Tumours (4 sites)
Central and peripheral nervous system Head and neck Thorax Breast Endocrine Upper gastrointestinal tract Lower gastrointestinal tract Hepatobiliary tract Genitourinary tract Gynaecological tract Musculoskeletal system	Paediatric tumours Haematological system Skin Rare conditions

Table 15: Subsites for each tumour site

Central and Peripheral Nervous System Brain Spinal cord Meninges Skull base Peripheral nerves	**Head and Neck** Orbit Lip Oral cavity Nasopharynx Oropharynx Hypopharynx Larynx Salivary gland Ear Nasal cavity Paranasal sinuses	**Thorax** Pleura Trachea Lung Mediastinum and thymus Heart	**Breast**	**Endocrine** Thyroid Parathyroid Pituitary Adrenal
Upper Gastrointestinal Tract Oesophagus Stomach	**Lower Gastrointestinal Tract** Small bowel Colon and rectum Anus	**Hepatobiliary Tract** Liver Pancreas Biliary tract	**Genitourinary Tract** Kidney Ureter Bladder Prostate Penis Testis	**Gynaecological Tract** Ovary Uterus Cervix Vagina Vulva
Musculoskeletal System Soft tissue Bone	**Paediatric Tumours** Medulloblastoma Neuroblastoma Nephroblastoma Retinoblastoma	**Haematological System** Lymphomas Leukaemia Plasma cell malignancies	**Skin**	**Rare Conditions** Neuroendocrine Tumours Benign conditions Others

Blue: Common tumours, Green: Less common tumours

For each tumour site, there are several topics as shown below. They are incorporated in Table 16 on competence level scoring.

1. Anatomy
2. Cancer pathology
3. Diagnostic and treatment work-up
4. Patient assessment
5. Treatment options and indications
6. Treatment assessment
7. Prognosis and outcome
8. Special issues
9. Radiotherapy[#]
10. Systemic therapy[#]
11. Oncological emergencies[#]
12. Supportive treatment[#]
13. Palliative care[#]
14. Evidence-based medicine[#]
15. Attitudes and values[#]

[#]Subjects in Therapy and Skills module

These topics are comprehensive incorporating knowledge, skills, attitudes and values that are required in order to manage each tumour site well. Subjects in basic sciences module form the foundation of the knowledge and skills for several topics. The examples are pharmacology for systemic therapy, radiobiology and radiotherapy physics for radiotherapy and medical statistics for evidence-based medicine.

Anatomy and cancer pathology are two subjects in Basic Sciences module which have great relevance to tumour site management. It is important for understanding the pattern of spread of each cancer type. Radiological anatomy skills are required for the identification of tumour volumes and organs at risk for radiotherapy contouring, planning and treatment delivery.

Trainees are required to know the various types of diagnostic tools and their use in various clinical situations in order to confirm the diagnosis. Extent of disease needs to ascertained and treatment work-up needs to be carried out to assess suitability for treatment.

Adequate assessment of patients is essential for both diagnosis and management plan. Appendix 4 describes the various components of patient assessment with their rationale and examples.

In oncology, it is very common for one particular clinical situation to have several treatment options with similar outcome but may differ in terms of nature of treatment and their side effects. Understanding the various options and their suitability is critical for the clinical oncologists to offer the best treatment. They are required to discuss the various options with patients to guide them in making an informed treatment decision.

There are various methods to assess benefit of treatment. This includes benefit in terms of tumour response, improvement of symptoms and quality of life while minimising the side effects of treatment. Appendix 5 shows the components and rationale of treatment assessment.

Prognosis depends on several factors mainly patient, tumour and treatment factors. For a particular cancer condition there are various ways used to predict outcome e.g., extent of disease (stage) and cancer subtypes. In some situation certain classification systems are used to describe prognostic groups that predict outcome and guide treatment decision.

Patients would usually require long term follow-up to monitor for recurrent disease and treatment effects. This is part of a survivorship programme. Special issues which may influence treatment choices include extreme age, fertility and hereditary conditions. Hereditary conditions may predispose patients to certain cancer types which may be prevented with some management strategies. Genetic testing and counselling are now more relevant with the advances in cancer therapy targeted towards certain genetic mutation.

The other topics (9 to 15) are described in Therapy and Skills module.

Common tumour sites

The syllabus has divided tumour sites into 15 sites. Eleven of these are considered as common tumour sites. These are tumour sites which are commonly seen in clinics as based on relatively higher incidence in Malaysia and most South-East Asian countries. Therefore, trainees are expected to know these well and achieve higher competency levels earlier in their training. Refer to Tables 14 and 15.

Less common tumour sites

Some tumours are rarely seen in clinics due to lower incidence e.g., skin cancers and neuroendocrine tumours. However, there are some tumours which are not rare in terms of incidence but not considered common for clinical oncologists because they are mainly managed by other physicians in terms of systemic therapy and overall care, but clinical oncologists see them when radiotherapy is indicated. Examples include paediatric malignancies which are

managed by paediatric oncologists and haematological malignancies which are managed by haemato-oncologists. Refer to Tables 14 and 15.

Competence level

Refer to Table 5 above for knowledge and skill level definitions. Examples of the competence levels definition for tumour sites can be found in Appendix 2. Table 16 shows the competence levels to be achieved at each year of training for common tumours and less common tumours respectively. Subjects in Therapy and Skills are described in specific in exit level ELAs (refer to Appendix 6).

Table 16: Competence level scoring for the Tumour Sites module

TOPICS	Ent		Y1		Y2		Y3		Y4	
	K	S	K	S	K	S	K	S	K	S
Anatomy	2		4		5		6		6	
	2		4		5		6		6	
Cancer pathology	2		5		5		6		6	
	2		5		5		6		6	
Diagnostic & treatment work-up	2		4		4		6		6	
	2		4		4		6		6	
Patient assessment History and physical examination Performance status, co-morbidities Tissue diagnosis Biochemical tests Biomedical imaging Other organ function tests Staging	3	3	3	3	4	4	5	5	6	6
	3	3	3	3	4	4	5	5	6	6
Treatment options & indications	1	1	3	3	4	4	5	5	6	6
	1	1	2	2	3	3	4	4	5	5
Treatment assessment Response – RECIST etc. Toxicity – CTCAE, RTOG etc.	1	1	3	3	4	4	5	5	6	6
	1	1	3	3	4	4	5	5	6	5
Prognosis & outcome Prognostic criteria / features Survival	1	1	2	2	3	3	5	5	6	6
	1	1	2	2	2	2	3	3	4	4

TOPICS	Ent		Y1		Y2		Y3		Y4	
	K	S	K	S	K	S	K	S	K	S
Special issues Survivorship Fertility Pregnancy Genetic counselling Age-related issues	2	1	3	3	4	4	5	5	5	5
	2	1	3	3	4	4	5	5	5	5
Radiotherapy[#]	1	1	3	3	5	4	5	5	5	5
	1	2	2	2	4	4	4	4	5	5
Systemic therapy[#]	2	1	3	3	4	4	5	5	6	6
	1	1	3	3	4	3	3	3	4	4
Oncological emergency[#]	3	2	5	4	5	5	6	6	6	6
	3	2	5	4	5	5	6	6	6	6
Supportive treatment[#]	2	2	4	3	5	5	5	5	6	6
	2	2	4	3	5	5	5	5	6	6
Palliative care[#]	2	2	4	4	5	5	5	5	5	5
	2	2	4	4	5	5	5	5	5	5
Evidence-based medicine[#]	2	2	4	3	5	4	5	5	5	5
	2	2	3	3	4	3	4	4	5	5
Attitudes and values[#]	2	3	4	4	4	4	5	5	5	5
	2	3	4	4	4	4	5	5	5	5

[#]Subjects in therapy and skills module, K:Knowledge, S:Skill

Common tumour sites in blue, less common tumour sites in green

Therapy and Skills

Clinical oncologists require specific skills to use various therapies managing patients with cancer. The therapy and skills are as listed here.

The subjects under this module are as listed:

1. Radiotherapy
2. Systemic therapy
3. Oncological emergencies
4. Supportive treatment
5. Palliative care
6. Evidence-based medicine
7. Attitudes and values

Radiotherapy

Trainees learn radiotherapy physics in Year 1. This knowledge is applied in clinical practice in radiotherapy. Several practical aspects are given more emphasis as shown in Table 17.

Table 17: Basic techniques in radiotherapy

Procedures	Skills to Acquire
Simulation	Patient position and set-up Immobilisation techniques Methods of target volume localisation • Direct marking • Conventional simulation • CT-simulation
Planning	Image registration and image fusion techniques Target volumes and organs at risk contouring • Specifies dose for targets and dose constraints for organs at risk • Contouring atlases e.g., RTOG etc. • Tolerance doses for organs at risk e.g., EMAMI, QUANTEC etc. Treatment techniques and beam arrangements • 2D, 3D conformal treatment, IMRT, VMAT, SRS, SRT etc. • Direct single field, parallel opposed, multiple planned fields, TBI, TBE • Electron therapy Tissue compensation Shielding • Blocks, multi-leaf collimators (MLC) Radiotherapy treatment plan evaluation • ICRU guidelines, dose distribution, DVH Radiotherapy prescriptions • Writing radiotherapy prescriptions • Understanding of dose specification Patient specific QA for IMRT plans
Treatment and verification	Radiotherapy treatment delivery and verification • Checking on set • DRR, portal imaging, IGRT, in-vivo dose verification techniques • Dealing with unplanned gaps/errors in treatment delivery • Assessment of changes in patient parameters and treatment modification as indicated Brachytherapy • Patient preparation • Insertion and removal of applicators • Interpretation checks films/images Planning and plan evaluation
Patient monitoring during therapy	Monitoring of side effects • Severity assessment based on criteria e.g., RTOG Management of side effects Treatment modifications if clinically indicated

Systemic therapy

A basic knowledge of the pharmacokinetics, therapeutic uses, dose ranges, toxicities of the currently used systemic therapy, range of multi-agent regimens and details of their administration are required. These are learnt in Basic Sciences module under the subject of pharmacology and are put into practice in clinical situations. List of procedures and the skills to acquire are shown in Table 18.

Table 18: Procedures and skills to acquire in systemic therapy

Procedures	Skills to Acquire
Assessment of patients for systemic therapy	Assessment • Focused history & examination to ensure patient's condition / disease has not changed since treatment was prescribed /decided • Co-morbidities • Performance status Discussion on treatment options • Aims of treatment and prognosis • Acute and late effects • Risk-benefit to individual patient • Informed consent
Prescription of systemic therapy	Initiation and authorisation of therapy • Indications of therapy • Regimens Prescription • Tests and procedures required prior to and during therapy • Methods of calculating correct dose (e.g., BSA, AUC) • Methods of assessing benefits of therapy • Supportive measures to prevent and treat side effects
Management of patients receiving systemic therapy	Delivery • Insertion, maintenance and care of intravenous lines • Arranging the insertion and care of central lines and devices • Safe handling of drugs e.g., drug spillage • Prevention and treatment of extravasation, line infection • Dose modifications relevant to investigation results and clinical findings • Interaction of systemic agents with other commonly prescribed medications Supportive measure • Side effect profiles of various drugs and the supportive therapy available • Pre-medications and hydration • Patient monitoring for toxicities and their management • Supportive therapy e.g., anti-emetics, mesna with ifosfamide Assessment of patients • Side effects and severity • Benefits of therapy: tumour response, clinical benefit

BSA: Body surface area, AUC: Area under the curve

Oncological emergency

Oncological emergencies are not a common occurrence but potentially have a significant impact on patients' morbidity and mortality. The common oncological emergencies and the knowledge and skills to acquire are shown in Table 19.

In order to manage each situation, trainees need to acquire the following knowledge and skills:

1. List of cancers commonly causing the condition
2. Signs and symptoms
3. Able to assess, diagnose and manage adequately
4. Know what investigations to arrange e.g., radiological investigations, including interpretation of images
5. Able to recognise urgency to initiate appropriate treatment
6. Know the appropriate indications for escalation of care including referral to other relevant specialties
7. Able to communicate effectively with patients, families and colleagues throughout crisis

Table 19: Common oncological emergencies and the knowledge and skills to acquire

Oncological Emergency	Knowledge and Skills to Acquire
Febrile neutropenia	Definition of febrile neutropenia Symptoms and signs of febrile neutropenia and relevant investigations Common infections in neutropenic patients Chemotherapy regimens that carry a risk >20% of developing neutropenia Common infections in specific patient populations e.g., patients with central lines, patients on-going head and neck radiotherapy brain concurrent chemoradiotherapy Indications of primary and secondary prophylaxis with granulocyte cell stimulating factor Antibiotics guidelines for febrile neutropenia and neutropenic sepsis Common complications in patients with prolonged sepsis
Spinal cord compression	Indication, dosage, side effects of corticosteroids Indications of orthopaedics referral and types of spinal surgery Indications of radiotherapy, dose fractionation/side effects of radiotherapy; consenting for radiotherapy; planning of radiotherapy under supervision. Retreatment– calculating BED, cord tolerance with retreatment, familiar with the RCR and ASCO guide of spinal retreatment protocol Rehabilitation and palliative care
Superior vena cava obstruction	Role of different treatment modalities and their indication e.g., superior vena cava stenting Indication, dosage, side effects of corticosteroids Discusses diagnostic and treatment options with patients and colleagues and to recommend the most appropriate treatment Radiotherapy planning Decision on chemotherapy
Hypercalcaemia	Calculation of actual serum calcium from measured serum calcium and albumin level Treatment options of hypercalcemia Fluid replacement and fluid balance monitoring Types of bisphosphonates and their indications Hypercalcemia in special conditions e.g., renal impairment/ cardiac failure
Brain metastases	Role of different treatment modalities and indication including referral to a neurosurgeon Indication, dosage, side effects of corticosteroids Radiotherapy planning (with supervision) Management of sequel of brain metastasis e.g., seizure management Rehabilitation and palliative care
Tumour lysis syndrome	Definition of tumour lysis syndrome Preventative measures of tumour lysis syndrome e.g., allopurinol, rasburicase, adequate hydration pre- and post-chemotherapy, active monitoring for high-risk patients Relevant laboratory investigation and interpretation of results
Bleeding from tumour	Recognising underlying medical illness/ medication/ on-going treatment which could aggravate tumour bleeding Compressive methods/ medication for superficial bleeding Therapeutic options for internal bleeding e.g., embolisation Radiotherapy planning (with supervision)

Supportive treatment

Supportive treatment is usually required for the prevention and management of treatment complications as well as to support cancer treatment. The common complications from chemotherapy and radiotherapy are listed in Table 20 below as examples. Candidates should have a knowledge on the agents used in these conditions including the drug groups, mechanism of action, indications, contraindications, pharmacokinetics and pharmacodynamics. These are learnt in the Basic Sciences module under the subject of pharmacology and applied in clinical practice.

For each complication, trainees should acquire the following knowledge and skills:

1. Diagnosis and assessment of patients
2. Assessment of severity and risk stratification
3. Relevant biochemical and radiological investigations
4. Management of treatment side effects including prevention and treatment
5. Drug prescription and patient monitoring
6. Drug and dose modification as required
7. Side effects of supportive drugs and their management
8. Appropriate indications for escalation of care including multidisciplinary referral

Table 20: Treatment-related complications and the knowledge and skills to acquire

Treatment-related Complications	Knowledge and Skills to Acquire
Emesis	Chemotherapy-induced emesis Radiotherapy-induced emesis Other causes (e.g., CNS, electrolyte imbalance, intestinal obstruction) Classification of emetogenic risk levels or emetogenic potential of the various chemotherapy and radiotherapy regimens Choice of antiemetic premedications based on risk level Assessment of emesis – assessing types and severity, hydration status Management of emesis
Myelosuppression	Causes, assessment and grading of neutropenia, thrombocytopenia, anaemia Management of myelosuppression - Primary and secondary GCSF prophylaxis - Blood product transfusion
Skeletal-related events	Causes, risk assessment Management –prevention, treatment Bone modifying agents, supplements
Thromboembolism	Causes, risk assessment Management - prevention, treatment Advantages and disadvantages of the different types of anticoagulants - oral vs injections Drug interaction with chemotherapy regimen

Palliative care

Palliative care is an important component in the holistic management of oncology patients. Good, early palliative management has been shown to improve patient outcomes. Pain, bleeding tumours, intestinal obstruction and effusions are common conditions among patients with advanced diseases. The psychological and social issues with regards to patients with terminal illness and their caregivers also need to be addressed. Candidates should have the knowledge of pharmacological agents used in these conditions including the drug groups, mechanism of action, indications, contraindications, pharmacokinetics and pharmacodynamics. These are learnt in the Basic Sciences module under the subject of pharmacology and applied in clinical practice. Table 21 describes the knowledge and skills to acquire in the management of various disease-related complications

For each condition, trainees should acquire the following knowledge and skills:

1. History and physical assessment
2. Diagnosis and assessment
3. Assessment of severity and risk stratification
4. Relevant biochemical and radiological investigations
5. Management including prevention and treatment
6. Drug prescription and patient monitoring
7. Drug and dose modification as required
8. Side effects of drugs and their management
9. Appropriate indications for escalation of care including multidisciplinary referral
10. Patient and family counselling

Table 21: Disease-related complications and the knowledge and skills to acquire

Disease-related Complications	Knowledge and Skills to Acquire
Pain	Types of pain, grading (pain score) Pharmacological and non-pharmacological methods of managing pain Assessment of response Acute and late side effects of analgesics/ other treatment Referral to other teams (pain specialists, interventionist, psychiatrists) Management of spiritual, psychological pain
Bleeding	Management of acute bleeding including hypovolemic shock Indications of other modalities to stop bleeding (surgery, embolisation) Indications and methods of blood product transfusion
Effusion	Indications and methods of pleural, peritoneal, pericardial tapping / drains Pleurodesis Care and monitoring of catheters and drains Procedure related complications and their management MDT management with other teams e.g., interventional radiologist
Malnutrition	Indications of the various feeding methods, parenteral nutrition etc. Management of complications related to malnutrition and the various

Disease-related Complications	Knowledge and Skills to Acquire
	feeding methods MDT management with speech therapist, dietitians, welfare officers, nurses
Obstruction	Medical management of intestinal obstruction Management of complications MDT management with surgeons, gastroenterologists, palliative care team
Neurological deficit	Identification of the site of the pathology based on complete neurological assessment and relevant investigations Management of brain metastasis, peripheral nerve involvement, cord compression and its complications MDT involvement including physiotherapists, rehabilitation, speech therapists etc.
Depression / anxiety	Risk factors Signs and symptoms Assessment of severity and indications for referral MDT involvement including psychologists, psychiatrists, counsellors etc.
Social issues	Financial issues Family support Respite care for caregivers Marital problems MDT involvement including social welfare, hospice, patient support group
End-of-life issues and care	Advanced care planning Terminal sedation Management of restlessness/ breathing difficulty Prognostication of intensive care outcome and resuscitation status Local policy regarding withholding or withdrawing life support therapy Family conference

MDT: Multidisciplinary team

Evidence-based medicine

Evidence-based medicine (EBM) integrates clinical experience and patient values with the best available research evidence. For many oncological conditions there are various treatment options supported by evidences. It is essential that trainees acquire skills in conducting research and evaluating research information so they are able to practice EBM. Table 22 summarises the components of EBM and the knowledge and skills to acquire.

Table 22: Components of EBM and the knowledge and skills to acquire

Components of EBM	Knowledge and Skills to Acquire
Critical appraisal of medical literatures	Principles of evidence-based medicine Medical literature search - including use of PubMed, Medline, Cochrane review Advantages and disadvantages of different study methodologies Level and quality of evidence Evaluation of statistical and clinical significance Application of current best evidence into clinical decision making
Research activity	Attend compulsory workshops on the following topics: - Good clinical practice (GCP) - Research methodology - Statistical analysis - Scientific writing
Clinical practice guidelines (CPG) and protocols	Evaluation and application of national and international guidelines Guideline and protocol development

Attitudes and values

Attitudes and values are pertinent to clinical practice including oncology.

Several important attitudes and values:

1. Strong work ethics
2. Good communication skills
3. Time management abilities
4. Problem-solving skills
5. Team-player spirit
6. Ability to accept and learn from criticism

Essential Learning Activities (ELA) – Exit Level

The evidence of minimum clinical competency required at the exit stage is assessed based on exit level Essential Learning Activities (ELAs). An essential learning activity is the identification and description of a clinical task in such a way that the trainee is fully aware of the knowledge, skills and attitudes (KSA) needed to complete the task and the trainer is fully aware of what needs to be observed to deem the task completed to a professional level (Frostick and Pitts 2017).

There are 12 Exit Level ELAs for trainees to be deemed competent in for the successful completion of training. The description of each ELA can be found in Appendix 6.

ELA 1	Formulating a treatment plan
ELA 2	Treating patients with external beam radiotherapy
ELA 3	Treating patients with brachytherapy
ELA 4	Treating patients with chemotherapy
ELA 5	Treating patients with targeted therapy and immunotherapy
ELA 6	Treating patients with hormonal therapy
ELA 7	Treating patients with other treatment modalities
ELA 8	Managing emesis related to cancer therapy
ELA 9	Palliating common cancer-related complications
ELA 10	Managing oncological emergencies
ELA 11	Conducting clinical research
ELA 12	Breaking bad news

Guidance Notes:

For Research, Patient Safety and Professional Values & Behaviours, refer to the Core Curriculum documents.

LEARNING OPPORTUNITIES

Summary of Learning Opportunities

During the course of training, trainees are provided with various learning opportunities at their workplace mainly in the clinical areas as well as access to online resources, teaching and meeting rooms and a mini library. Each training centre with an oncology department is equipped with the facilities for clinical training such as outpatient clinics including multidisciplinary clinics, chemotherapy day-care, oncology wards and radiotherapy planning and treatment equipment. Supporting departments such as radiology, nuclear medicine and pathology should be available either in-house or in the vicinity.

Some of the teaching sessions, especially for basic sciences, will be in the form of didactic lectures or tutorials but most of the learning will be through clinical or hands-on experience with regular assessment and feedback from the respective trainers. A typical trainee week is described below. Regular attendance at journal clubs and mortality and morbidity meetings provides further learning opportunities. There are several external short courses which are compulsory for trainees. Trainees are encouraged to participate in cancer-related conferences or scientific meetings at both national and international levels as part of their continuous medical education.

Workplace Opportunities

Most of the teaching and learning experience will be gained at the workplace. Trainees will learn from the various clinical activities using the resources and facilities available to them at the training centres. The learning experience is guided by trainers accordingly.

Typical trainee week

Clinical training over the four years duration is divided into eight blocks of clinical attachment. Each attachment is six-months in duration. The attachment may involve rotations to several training centres. Each trainee will be allocated to at least one trainer in each attachment.

For practical purposes, each weekday is divided into two sessions i.e., morning and afternoon sessions and therefore there are 10 sessions within a five-day period. An example of a typical week for trainees is shown in Table 23. Sessions for clinical activities e.g., clinics, ward-rounds, radiotherapy (RT), planning, multidisciplinary team (MDT) meetings or clinics, lectures, research, continuous medical education e.g., journal clubs and personal studies. The order of the activities throughout the week varies according to the weekly schedule for the trainers that trainees are allocated to. Activities such as journal clubs and educational meetings may take place fortnightly or monthly depending on the individual training centre. Articles for journal clubs and cases for mortality and morbidity (M&M) meetings are presented by trainees.

Didactic lectures will be delivered hand-in-hand with clinical training. The number of lecture-hours per week varies according to year of training. Formal teaching sessions are scheduled for Year 1 and Year 2 as described in Syllabus Section. Some of the basic science subjects in Year 1 are delivered as short courses instead of regular weekly lectures.

Table 23: Examples of activities in a typical trainee week

	Monday	Tuesday	Wednesday	Thursday	Friday
A.M.	Ward Round *New patient clinic*	Ward Round *Follow up clinic*	*Grand Round* *MDT clinic 1*	Ward Round *RT planning 2* *Chart round*	Ward Round *MDT clinic 2*
Lunch		Journal club		M&M meeting	
P.M.	Lecture	Chemotherapy day-care	*RT planning 1*	Research	Personal study On-call

Trainers are expected to be involved in activities written in *italic*.

Typical centre facilities

Facilities to be used during a typical week include:

- Clinic consultation rooms
- Radiotherapy treatment planning equipment and treatment machines
- Brachytherapy theatre
- Day care
- Ward
- Teaching/meeting rooms equipped with audio-visual facilities
- Other supporting clinical departments
- Doctors' office
- Mini library
- On-call room
- Internet access

Trainers guidance

Trainers are present to supervise, teach and assess the trainees during most of the clinical sessions. They will also deliver lectures and moderate journal club sessions as well as mortality and morbidity meetings. During the course of the week trainees should discuss the management of patients seen in clinics or wards with their trainers e.g., grand ward round, case discussion sessions. For intervention-based activities (IBA) such as radiotherapy planning, a Year One trainee should be supervised closely initially and gradually perform the procedures with increasing independence as they progress to more senior years in the programme.

Teaching Programme

Timetables for classroom teaching will be distributed to the trainees and trainers at the beginning of each academic year. The mode of teaching will be in the form of face-to-face didactic lectures and tutorials, e-lectures and assignments as well as presentations and discussions.

Opportunistic teaching and learning, hands-on experience and skills development will take place in clinical areas as part of clinical training under the supervision of trainers. This has been described above.

Online Resources

Trainees are expected to access the following resources as part of their learning process:

Malaysian websites e.g., Ministry of Health – Systemic anticancer guideline; tumour sites Clinical Practice Guidelines, e.g., cervix, colorectal, breast; National Cancer Registry.

University websites – E-learning portal (e-spectrum, Microsoft Teams); online curriculum, postgraduate handbooks.

Other web-based resources – Cancer journals; guidelines (NCCN, RTOG, SIOP, ILROG, ESMO, ESTRO etc.); IAEA; AJCC etc.

External Opportunities

There are several courses and workshops that are compulsory for trainees to attend over the course of their training. These courses may be provided by external organisations but must be authorised by bodies such as Ministry of Health, Ministry of Higher Education, local universities, other government bodies e.g., Institut Tadbiran Awam Negara (INTAN); professional bodies or societies e.g., Malaysia Medical Association (MMA); cancer research bodies e.g., Cancer Research Malaysia (CRM); oncology societies e.g., Malaysia Oncological Society (MOS); and accredited non-governmental organisations e.g., Hospis Malaysia.

Compulsory courses and workshops

Compulsory courses and workshops to be attended:

- Communication skills
- Medical ethics
- Good clinical practice workshop
- Research methodology or similar
- Statistical analysis e.g., SPSS, STATA
- Scientific writing or similar
- Palliative care e.g., pain management
- First FRCR Examination Preparatory Course (for FRCR pathway only)
- Final FRCR Examination Preparatory Course (for FRCR pathway only)

Optional resources

Optional courses and workshops:

1. Scientific meetings of oncology societies
2. Oncology seminars by local or international institutions
3. Radiotherapy workshops

Personal Study

Trainees are encouraged to form small study groups with fellow students on the programme. They can assign a topic of interest to each study group member who will then present the topic for discussion. Past examination papers for Master of Clinical Oncology are available on the e-learning portal of the university website. Study groups should meet on a regular basis at their own convenience. The frequency of meetings depends on the need of the group. It is anticipated that study groups will meet up at least once a week nearer to an examination. Individual study will be at the discretion of each trainee. Trainers are not involved in these activities.

Feedback Sessions

There will be several scheduled feedback sessions between trainees and trainers or programme administrators during the course of training namely pre-attachment and post-attachment review meetings. This is described in detail in the Assessment Section.

Pre- and post-attachment review meetings will be initiated and organised by both trainers and their trainees. The purpose of a pre-attachment review is to review what a trainee has done or achieved in previous clinical attachments so as to identify gaps in clinical training, room for improvement and to formulate plans to close the gaps in the current attachment if applicable. A post-attachment review will take place at the end of a clinical attachment. This is a review of what a trainee has done and achieved in that attachment including a review of the assessments that have taken place during the period. The trainers will give verbal and written feedback to the

trainees on their overall performance during that attachment. The Clinical Attachment Appraisal (Appendix 12, Form 12-1) will be used and completed for this purpose.

Accreditation

Each centre with an oncology department must fulfil certain criteria in order to be accredited as a training centre. An accreditation visit will be carried out by the National Programme Director and Coordinator. Re-accreditation exercises will be conducted at least once every five years. This is described in Quality Assurance and Accreditation Section.

ASSESSMENTS

Introduction

Assessment is required to ensure that the learning objectives of the curriculum have been achieved. It is an essential part of training and reflects the activities that the trainee will perform as a clinical oncologist. These include clinical activities relating to the care of individual patients, and non-clinical activities relating to administrative and organisational tasks, and academic skills. The assessment strategy has three primary functions:

1. To encourage and monitor learning, identify training gaps and generate the evidence of competency.
2. To assess whether the trainee is ready to progress to the next level of the programme.
3. To generate and evaluate evidence that the trainee is able to care for the patients in a safe and effective way as a specialist.

The assessments are categorised into two types:

1. Workplace-based assessment (WBA)
   These are formative assessments i.e., assessments for learning. They are undertaken continuously throughout training in real clinical environments. They provide structured observation and feedback to the trainees to help them recognise gaps in learning and rectify these problems in order to improve their performance.
2. Examinations
   These are summative assessments i.e., assessment of learning. The examinations are taken at specific points in the programme to establish if the trainee is ready to progress to the next level or phase. These are written and clinical examinations on knowledge and clinical skills, to provide evidence demonstrating that trainee has met the requisite standard for that stage of training.

Throughout Clinical Oncology training both forms of assessment are used to evaluate various aspects of training and the learning objectives. The assessment tools used are shown in Figure 4.

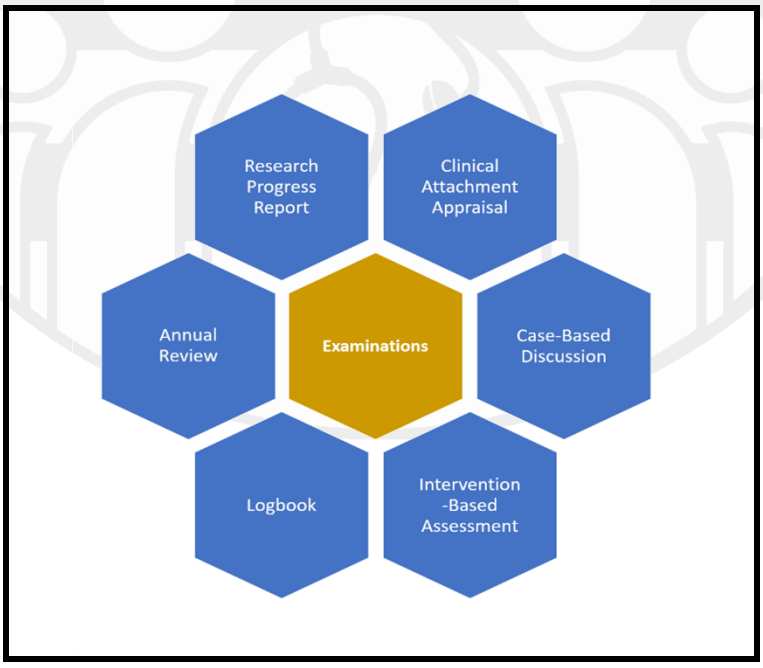


Figure 4: Assessment tools in Clinical Oncology training.

These assessments are undertaken at various intervals throughout training. Table 24 summarises the timelines.

Table 24: Timelines for the assessment tools

Assessment Tools and Records	Timelines
Workplace-based assessments (WBA) Case-based discussions (CBD) Intervention-based assessments (IBA)	Throughout training
Log of clinical experience Radiotherapy logbook Systemic therapy logbook	Throughout training
Progress Review Clinical Attachment Appraisal (CAA) Annual review of Clinical Oncology Training Portfolio (COTPort)	At least six-monthly during each clinical rotation Annually throughout training
Research progress report	Six-monthly until completion of project
Examinations Part One Examination Part Two Examination Final Examination	At the end of Year 1 At the end of Year 2 At the end of Year 3
Clinical Oncology Training Portfolio (COTPort) Logbooks of radiotherapy and systemic therapy experience Records of workplace-based assessments Records of research projects Records of courses attended Review of professional behaviour via records of attendance to classes etc. Progress in examinations	Acquired and compiled throughout training and formally assessed at annual review.

The COTPort is available in Appendix 12, Form 12-3: Annual Review Report

Examinations

Figure 1 in the Overview Section shows the examination components for both the MCO and FRCR pathways. A summary of the examinations and their timelines are shown in Table 25.

MCO pathway

The Part One Examination is a written examination to assess knowledge in the Basic Sciences subjects; cancer biology, cancer pathology, medical statistics, pharmacology, radiobiology and radiotherapy physics. It comprises multiple-choice questions (MCQs), and structured short-answer questions (SAQs).

The Part Two Examination consists of both written and clinical components testing the knowledge, skills and attitudes and values in relation to tumour site management. It covers the application of basic sciences and oncology-related knowledge, including radiotherapy, systemic therapy, interpersonal and communication skills, professionalism and research. The written component comprises of multiple-choice questions (MCQs), and case-orientated questions (COQs). The clinical component includes clinical short cases (CSC), and an objective structured clinical examination (OSCE), designed to assess competencies in tumour site management. Competencies for exit level ELAs are also assessed. Exit level ELAs are described in the Syllabus Section (refer to Appendix 6).

The Final Examination includes both a formal review of training progress based on workplace-based assessments and the assessment of the research report.

FRCR pathway

The Part One Examination (First FRCR Examination), is a written examination assessing the basic science subjects. The Part Two Examination (Final FRCR) is divided into Part A consisting of written component, and Part B which examines the clinical component. Trainees are encouraged to visit the Royal College of Radiologists website for further information on the examinations.

The Final Examination for the FRCR pathway is similar to that of the MCO pathway.

Table 25: Summary of the examinations and their timelines

Period of training	PRE-ENTRY		YEAR 1		YEAR 2 - 3		YEAR 4
Content	**Oncology entrance evaluation** Objective: To ensure a sound foundation for further specialisation training Endpoint: Achieve passing score to be eligible for entrance interview		**Part One Examination** **(**At the end of Year 1) Objective: Testing knowledge in basic sciences subjects Endpoint: Achieve passing score		**Part Two Examination** (At the end of Year 3) Tumour sites, skills and consolidation of basic sciences Candidates are required to make satisfactory progress in their portfolio in order to sit for Part Two examination		**Final Examination** Research project submission either as - Research report - Publication in medical journals Continuous workplace-based assessment
Components	Multiple choice questions (MCQs)	Objective structured clinical examination (OSCE) Based on entry level ELAs (Appendix 1)	Multiple choice questions (MCQs)	Structured short answer questions (SAQ)	Multiple choice questions (MCQ) Case orientated questions (COQ)	Clinical short case (CSC) Objective structured clinical examination (OSCE) Based on exit level ELAs (Appendix 6)	Research project submission Workplace-based assessments
Description	Basic medical, surgical, anatomy, general oncology, oncological emergencies, radiology, miscellaneous (gynaecology, paediatrics, ENT, ethics)	Clinical questions based on the entry level ELAs	Cancer biology, cancer pathology, medical statistics, pharmacology, radiobiology, radiotherapy physics	Cancer biology, cancer pathology, medical statistics, pharmacology, radiobiology, radiotherapy physics	Assess the ability to detect important clinical signs, interpret these clinical signs and generate treatment plan; Assess ability to communicate effectively with patients	OSCE	Research report (Appendix 12, Form 12-2)
Assessors	MedEX Committee	COSCO Trainers	Trainers Internal Examiners External Examiners				

Trainees who do not pass the examinations are allowed to re-sit the examinations according to the rules and regulations specified by the university for MCO Examinations and Royal College of Radiologists UK for FRCR Examinations.

Workplace-Based Assessments (WBA)

The purpose of a WBA is to facilitate and improve learning by providing trainees immediate feedback in a real clinical environment, provide reflections, measure their performance and identify areas for improvement.

Workplace-based assessments involve several progression checkpoints to ascertain that trainees' learning objectives have been achieved based on the training content and stage. Each trainee is required to participate actively in clinical sessions and to complete WBAs as required by the specified timescales. Their records should demonstrate that the rate of completion is satisfactory, the levels of performance are at the required standard and are improving, to confirm that learning is taking place.

Assessments take place regularly at various intervals throughout training. The trainee's overall progress is also assessed during annual review. The aim of this review is to ensure that trainees have attained the expected level of competency commensurate to their year of training. It also allows trainees to check on their progress throughout their training.

All records of assessment and progress will be reviewed at the end of training by the exit committee before trainees are awarded the certificate that marks the successful completion of training.

Each trainee is required to participate actively in clinical sessions and to complete workplace-based assessments as required and by the timescale specified. The forms can be found in Appendices 7 to 12. The portfolio record should show that the rate of completion is satisfactory and the levels of performance are improving to show that learning is taking place.

Assessment strategy

Throughout each rotation, the performance of trainees is evaluated regularly using case-based discussions (CBD), intervention-based assessments (IBA) and logbooks. This regular assessment and feedback will help continuous monitoring of learning progression while providing guidance to trainees to learn more effectively through reflection. Table 25 above shows a summary of assessment timelines including examinations and WBAs. Schedules for assessment by year of training are shown in Table 26. The checklist on minimum number of WBAs to be performed is shown in Appendix 7. The recommended number of assessments is the minimum requirement and trainees are encouraged to do as many as possible. Trainees must arrange meetings with trainers before the end of each rotation to discuss training progress and to identify any gaps to be filled in the next rotation. Feedback is delivered face to face and recorded in the clinical attachment appraisal (CAA) form. All WBA forms can be found in Appendices 7 to 12.

Table 26: Schedule for assessment according to the year of training and syllabus

<table>
<tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th></tr>
<tr><td rowspan="5">Syllabus schedule</td><td>Basic Sciences</td><td colspan="3">Implement basic sciences knowledge into clinical practice</td></tr>
<tr><td>Oncological emergencies</td><td colspan="3">Show progress in management of oncological emergencies</td></tr>
<tr><td>Year 1 palliative radiotherapy</td><td>Year 2 palliative radiotherapy</td><td>Year 3 palliative radiotherapy</td><td>Show progress in competency in palliative radiotherapy</td></tr>
<tr><td>Acquire competency in at least one tumour site</td><td>Acquire competency in Year 2 tumour sites</td><td>Acquire competency in Year 3 tumour sites</td><td>Acquire competency in all tumour sites and advanced radiation techniques</td></tr>
<tr><td colspan="2">Communication skills course
Palliative care-related courses
(Refer to COTPort in Appendix 12)</td><td colspan="2">Leadership training
Professionalism
Medical ethics course</td></tr>
<tr><td>Workplace-based assessments</td><td colspan="4">CBD, IBA-RT, IBA-ST
(Refer to Appendix 7 for minimum number of cases required)</td></tr>
<tr><td>Research / Clinical trials</td><td>Courses
- GCP
- Research methodology
Research proposal</td><td>Courses
- Scientific writing
- Statistical analysis
Medical ethics approval
Research project</td><td colspan="2">Report / publication</td></tr>
<tr><td>Examinations</td><td colspan="2">Part One Examination</td><td>Part Two Examination</td><td>Final Examination</td></tr>
</table>

Schedule of assessment

Tumour sites have been categorised into common and less common tumour sites according to incidence of cancer and their complexity. Competencies in each tumour site are defined by academic year and are expected to be accomplished within the recommended period. Trainees are required to fulfil the minimum requirement in each training component according to the schedule provided in Appendix 7. Workplace-based assessments will continue as per schedule for trainees who do not pass examinations, and will be tailored to their training need.

By the end of Year 1, trainees are expected to achieve competency in oncological emergencies and have completed the minimum requirements of CBDs and IBAs (Appendices 9-11). Logbooks are used to record experiences in radiotherapy and systemic therapy throughout training. These are found in Appendix 8.

Any gaps of training must be discussed with trainers and problems are rectified to ensure efficient and effective learning.

Logbook

Logbooks are used to document the evidence of radiotherapy and chemotherapy cases managed by trainees. These are required to be updated on time throughout the programme of training. All logbook forms are listed in Appendix 8.

Case-based discussion (CBD)
Case-based discussions (CBDs) are based on cases seen in a typical clinical setting e.g., in clinics or the wards. Refer to Appendix 9

Intervention-based assessment (IBA)
Intervention-based assessments (IBAs) are used to assess skills in the planning and delivery of radiation and systemic therapy. Refer to Appendices 10-11

Clinical attachment appraisal (CAA)
The Clinical attachment appraisal (CAA) is an appraisal by the trainers supervising the trainee in a specific clinical rotation. Refer to the forms in Appendix 12, Form12-1.

Research project
Progress of research project is monitored to make sure it is on track. Research progress report, content of oral presentation / poster presentation and publications will be regularly reviewed. The research progress report form is provided in Appendix 12, Form 12-2.

Annual review
The aim of this review is to ensure that trainees have attained the expected level of competency according to their year of training. Trainees who do not meet the expected level of competency may require remedial actions. Trainees may have to extend their training period and / or be barred from examination if the progress is unsatisfactory.

The committee for the annual review comprises of the national programme coordinator, centre programme director and senior trainers. Feedback is given verbally to the trainee during the session followed by a written report. Trainees who require remedial action will be reviewed again following the timeline determined by the panel of reviewers.

Annual review form can be found in Appendix 12, Form 12-3.

Courses

Trainees are encouraged to attend professional courses throughout their training for the continuous development of their professional knowledge and competence. There are several compulsory courses that they should attend as listed in Annual Review form in Appendix 12, Form 12-3.

Professional Behaviour

Trainees are expected to show a high standard of work ethics and professionalism towards patients and colleagues. It includes interaction with colleagues and patients, attendance at work place and teaching sessions, presence of any disciplinary or other issues. Adequate attendance is required for the clinical and teaching sessions. Trainees are required to achieve at least 80% attendance of the compulsory teaching sessions.

A disciplinary record is kept by each training centre. This record is available to trainee and trainer at any time and will be reviewed annually. In order to progress in training there should be no outstanding disciplinary issues. Examples of disciplinary issues include being repeatedly uncontactable during on-call, falsifying documents or absences without valid reason.

Clinical Oncology Training Portfolio (COTPort)

It is the responsibility of the trainee to complete the workplace-based assessments and other activities during training period and file them in Clinical Oncology Training Portfolio (COTPort) in a timely manner. The COTPort document checklist is shown in Annual Review Report form in Appendix 12, Form 12-3. It includes a logbook for radiotherapy and systemic therapy, workplace-based assessments, the research project, courses and professional behaviour.

DOCUMENTATION

Clinical Oncology Training Portfolio

The Clinical Oncology Training Portfolio (COTPort) is a set of documents which shows the evidence and keeps a record of training progress. It contains logbooks of radiotherapy and systemic therapy experience, records of; workplace-based assessments, the research project, courses attended, and the review of professional behaviours utilising records of attendance to classes and examination progress. The list of items included is shown in Table 27. The forms for the assessment tools used can be found in Appendices 7 to 12.

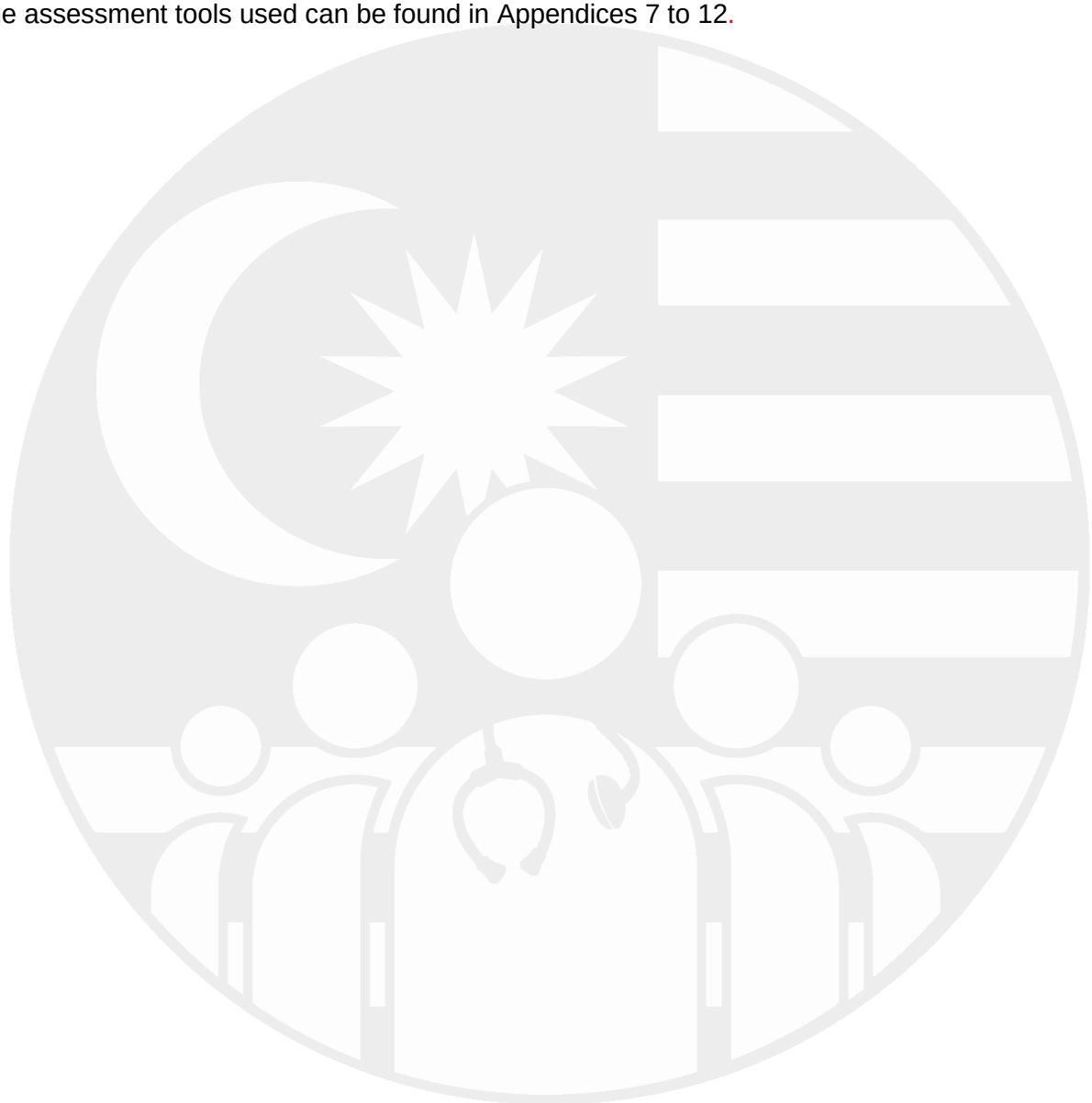


Table 27: Contents of COTPort

Clinical Oncology Training Portfolio (COTPort)	Satisfactory / Fulfilled	Unsatisfactory / Not fulfilled	Remarks
Part A: Logbooks			
Radiotherapy			
Systemic therapy			
Part B: Clinical Attachment Assessment			
Case-Based Discussion (CBD) General skills			
Intervention-Based Assessment (IBA) Radiotherapy (IBA-RT)			
Intervention-Based Assessment (IBA) Systemic Therapy (IBA-ST)			
Clinical Attachment Appraisal (CAA)			
Part C: Research Project			
Research Progress Report			
Oral Presentation			
Poster Presentation			
Publications (*including proceeding)*			
Part D: Courses			
Good Clinical Practice			
Research Methodology			
Scientific Writing			
Statistical Analysis			
Communication Skills			
Medical Ethics			
Palliative Care			
FRCR Examination Preparatory Courses			
Part E: Professional Behaviour			
Work Attendance			
Formal Teaching Session Attendance			
Discipline			
Others (feedback, reflective practice)			
Part F: Examinations			
Part One MCO / First FRCR			
Part Two MCO / Final FRCR			
Final			

Trainees are responsible for maintaining and keeping their COTPort. The items on COTPort are reviewed formally at the annual review that occurs on an annual basis during training. The annual review report and COTPort can be found in Appendix 12, Form 12-3. Annual review reports are kept by the national curriculum administrative office. Trainees are provided with a copy of these reports for their records.

List of Documents in the Appendices

The relevant documents are available in the appendices as shown in Table 28.

Table 28: List of documents in the appendices

Documents	Appendices
Checklist for minimum cases for assessment	7
Logbooks	8 (Forms 8-1 to 8-23)
Case-based discussion (CBD)	9
Intervention-based assessment for radiotherapy (IBA-RT)	10 (Forms 10-1, 10-2)
Intervention-based assessment for systemic therapy (IBA-ST)	11 (Forms 11-1, 11-2)
Clinical attachment appraisal (CAA)	12 (Form 12-1)
Research progress report	12 (Form 12-2)
Annual review report – Clinical Oncology Training Portfolio (COTPort)	12 (Form 12-3)

DISCIPLINE AND SUPPORT

Discipline and support are normally guided by the rules and regulations of individual training universities or professional bodies.

LINKS TO OTHER CURRICULA

Introduction

This chapter provides an overview on how the Clinical Oncology training programme is dependent on the integration with other specialties and training programmes. To create a more holistic approach to training in Clinical Oncology, integration and intersection to the providers of other healthcare services and their training programmes have been put in place to facilitate the transfer of knowledge and skills at different stages of training.

Curricula Related to Clinical Oncology Curriculum

Basic medical training prior to entry into formal training in Clinical Oncology is essential for potential trainees to acquire the knowledge, skills, attitudes and values required. Therefore, the curricula for undergraduate, house-officer and medical officer levels are an essential grounding for training.

Within the NCCOM programme, some trainees will undergo training through the FRCR pathway and therefore the FRCR curriculum has an impact on the training. A trainee's experience during their period at the UK training centres must to be monitored and reviewed to confirm it fulfils the NCCOM requirements.

Table 29 summarises the various curricula that are relevant to NCCOM.

Table 29: Links to other curricula

CURRICULUM (Training Programme)	Nature of Relationship	Clinical Oncology Expectation	Anticipated Problems	Strategies & Solutions
Undergraduate	Dependent	Know common cancers Know common treatment for cancers Know common signs and symptoms of cancer Know the relevant investigations Able to take history and carry out physical examination	Unable to influence the quality of training especially overseas graduates Minimal oncological exposure during training	Establish clarity in curriculum
House Officer (HO)	Dependent	Able to manage common medical and surgical conditions Able to manage pain Able to take history and carry out physical examination Able to carry out relevant investigations Recognise common signs and symptoms of cancer Recognise common oncological emergencies	Too many HO – not enough exposure to patient care Limited exposure to cancer patients due to limited availability of cancer centres Limited exposure to non-surgical cancer therapy e.g., radiotherapy	Open up more HO training centres

CURRICULUM (Training Programme)	Nature of Relationship	Clinical Oncology Expectation	Anticipated Problems	Strategies & Solutions
Medical Officer (MO)	Dependent	Able to take focused history and examination Able to assess and manage pain Able to manage severe infection e.g., infection due to febrile neutropenia Able to manage common complications of cancer and its treatment e.g., pain, bleeding from tumour, bowel obstruction, deep vein thromboembolic events, hypersensitivity reactions Able to manage various medical and common surgical conditions Able to work-up patients for cancer diagnosis, staging and management Know the basic management for common cancers e.g., breast, lung and colon cancer	Limited exposure to cancer patients due to limited availability of cancer centres Limited exposure to non-surgical cancer therapy Lack of supervision Poor awareness of limitations Unclear of how to advance oneself to enter Clinical Oncology training programme Lack of opportunity to enter the relevant specialties to fulfil the entry criteria for Clinical Oncology postgraduate training e.g., medicine and surgery	Closer monitoring and guidance Make entry criteria clear in curriculum so future applicants will be aware of requirements and will know how to proceed Facilitate entry into major posting, this will require support from MOH
FRCR	Independent	Gain more experience in tumour-site subspecialty Gain in-depth experience in intra and inter-department work dynamics especially with the radiotherapy team member e.g., medical physicists, dosimetrists and therapy radiographers Different work culture experience More exposure to research work especially clinical trials Experience in other cancers not common in Malaysia e.g., lymphoma, skin Gain experience in more advanced radiotherapy techniques and cutting-edge systemic treatment	May see less of certain common cancers in Malaysia e.g., nasopharyngeal cancer, cervical cancer Difficulty to secure adequate number of placements at the UK training centres Difficulty to retain trainees after completion of training (brain drain)	To gain experience while in Malaysia before or after the training in the UK as part of the national curriculum Long term collaboration with training centres in the UK Higher penalty for those who break the scholarship agreement

EXIT CRITERIA

Summary of Exit Criteria

The National Curriculum of Clinical Oncology Malaysia (NCCOM) prepares trainees to become competent oncologists who are able to provide comprehensive patient-care in a safe and compassionate manner. On completion of training, the trainee will have the knowledge and experience to manage the common oncological conditions which they will encounter in daily practice. The scope of the curriculum equips trainees with the skills for continuous life-long learning so that throughout their career they can enhance their knowledge and skills with the progress and development of cancer treatments.

The qualities expected of a qualified oncologist include:

1. Competent in managing cancer patients efficiently, compassionately and safely
2. Has good work ethics and works well in a team
3. Resourceful in continuous life-long learning and nurtures enthusiasm in research
4. Dedicated and keen to contribute to the growth of the specialty and in giving back to society e.g., teaching the juniors and allied health care staff
5. Good leadership qualities with the initiative and ideas to develop the service and specialty

The criteria for the trainees to graduate from the training programme is described in Table 30 which will be reviewed and evaluated at the exit review session towards the end of training. This will be carried out by the exit review committee. The exit committee comprises the head of programme, programme coordinator, training coordinator, research coordinator and trainers.

Table 30: Exit criteria to be fulfilled by trainees by the end of training

Scope	Description
Training duration	Duration of training is a minimum of four years and a maximum of seven years. The number of days on leave should not exceed the stipulated limit set by the programme.
Examination*	Comprises Part One, Part Two and Final Examinations. The Part One Examination is at the end of Year 1. The Part Two Examination is at the end of Year 2. The Final Examination is at the end of Year 4.
Continuous assessment*	Throughout the programme, trainees undergo continuous assessments in the form of workplace-based assessments to ensure they achieve the adequate level of competency. This includes the completion of logbooks, clinical attachment assessments, a research project and the compulsory courses.
General conduct	Trainees need to fulfil the minimum attendance requirement for days at work and formal teaching sessions. Trainees should not have any major misconduct issues. Disciplinary issues are taken seriously and may result in expulsion from the programme.

*Further description can be found in the section on Assessments

COMPLIANCE AND MAPPING

Compliance and Mapping to Malaysian Medical Council Standards

In Malaysia, standards for postgraduate training of medical practitioners are set by the Malaysian Medical Council, (MMC), under its Medical Education Committee. Postgraduate programme compliance to these standards is vetted by the Specialty and Sub-Specialty Education Committees. Compliance to standards in the implementation of these programmes is monitored by the National Conjoint Board, Conjoint Specialty and Sub-Specialty Training Committees. The conduits for discussions between MMC and these committees are the Joint Committees on Postgraduate Medical Education and Training (see Section: Contributors).

The areas of the MMC standards can be mapped to the following components of this National Curriculum, as summarised in Table 31 below.

Table 31: Mapping to MMC standards[1]

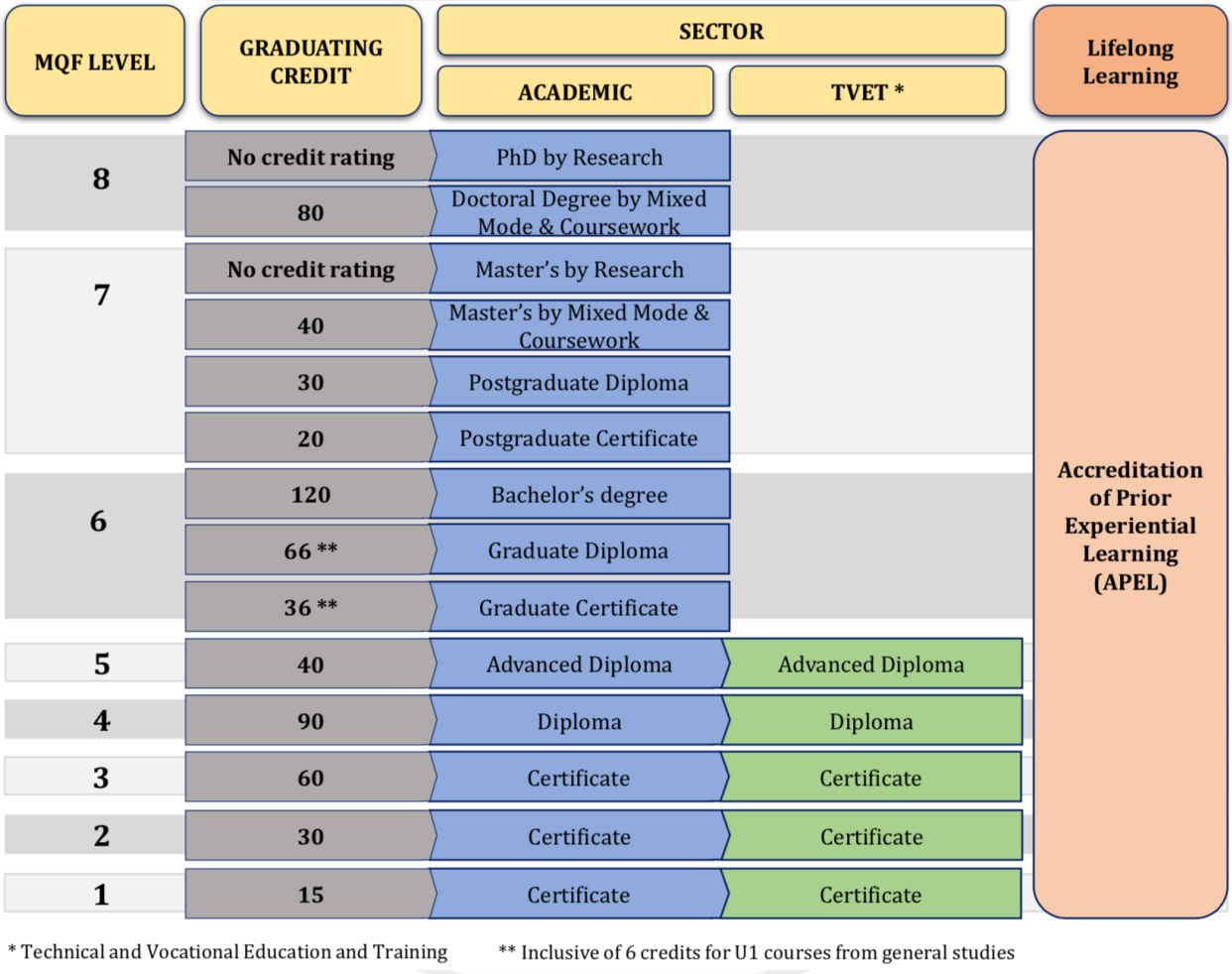
Area	Purpose & Scope	National Curriculum section(s)
1	Programme development and delivery	Overview Contributors
2	Assessment of trainee learning	Exit criteria Assessment
3	Trainee selection and support services	Selection and recruitment Discipline and support
4	Trainers	Contributors Discipline and support
5	Educational resources	Syllabus Learning opportunities Documentation
6	Programme management	Contributors
7	Programme monitoring, review and quality improvement	Quality assurance and accreditation

[1]Specialty Education Committee of the Malaysian Medical Council. (2020). Malaysian Standards for Medical Specialist Training. Updated 26 February 2020. https://mmc.gov.my/wp-content/uploads/2020/03/26-Feb-2020-Malaysian-Standards-for-Medical-Specialist-Training-Approved-by-Council-18-June-2019.pdf

Compliance and Mapping to Malaysian Qualifications Framework

The Malaysian Qualifications Agency, (MQA), was officially established in 2007, and developed the Malaysian Qualifications Framework, (MQF) as a basis for quality assurance and accreditation of Malaysian higher education programmes. Higher education programmes are assigned an MQF level according to their purpose, learning outcomes, credits, discipline, type of programme, minimum entry requirement and typical duration, as summarised in Figure 5. Clinical Masters programmes are currently designated as Level 7, similar to non-clinical Masters programmes. However, the duration and learning outcomes of the Clinical Masters programmes, in line with the National Curriculum, are more in keeping with Level 8 programmes (Figure 5).

The MQF learning outcomes clusters are mapped against the National Curriculum in Table 32.



[2]Malaysian Qualifications Framework (MQF) 2nd Edition, updated 2 October 2019

Figure 5: MQF Levels.[2]

Table 32: Mapping to MQF Learning Outcome Clusters[2]

MQF LO Cluster	National Curriculum Section(s)
Knowledge and understanding	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus: ▪ Knowledge syllabus: ▪ Assessment
Cognitive skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Professional behaviours syllabus ▪ Research syllabus Assessment Learning opportunities
Functional work skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Professional behaviours syllabus ▪ Research syllabus Assessment Learning opportunities
Practical skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus: ▪ Skills syllabus Assessment
Interpersonal skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Professional behaviours syllabus ▪ Research syllabus Assessment Learning opportunities
Communication skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Professional behaviours syllabus ▪ Research syllabus Assessment Learning opportunities
Digital skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Research syllabus Assessment Learning opportunities

MQF LO Cluster	National Curriculum Section(s)
Numeracy skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Research syllabus Assessment Learning opportunities
Leadership, autonomy and responsibility	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Assessment Learning opportunities
Personal and entrepreneurial skills	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Professional Behaviours Syllabus ▪ Research syllabus Assessment Learning opportunities
Ethics and professionalism	Exit criteria ▪ Required courses ▪ Essential Learning Activities (ELA) Syllabus ▪ Professional Behaviours Syllabus ▪ Research syllabus Assessment Learning opportunities

LO: Learning objective

Compliance to Institutional Requirements

Individual institutions offering training programmes may have additional internal requirements which are not stated in this National Curriculum. Programme directors should ensure that these requirements are met.

APPENDICES

Appendix 1: Entry Level ELAs

ELA 1: Assessment of a patient with cancer

Entry Essential Learning Activity 1	
Activity	Assessment of a patient with cancer
Description	Take focused history, perform the relevant physical examination and review relevant investigations in a patient with cancer diagnosis.

All items on the table below are examples, they do not constitute an exhaustive list in any aspect

Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Current five most common cancers in Malaysia – diagnosis, pattern of spread, staging investigation, symptomatology General cancer treatment: surgery, chemotherapy, radiotherapy, hormone therapy Common side effects of cancer treatment	Communicate with patients, families and other medical staff Obtain relevant information from patient and family Interpret relevant documents & investigation results Conduct focused physical examination Manage time	Courteous Empathetic Patient Thorough Honest Kind Efficient

Examples of Behaviours

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Clarifies the relationship between patients and accompanying persons Puts the patient and family at ease Observes privacy & confidentiality Uses appropriate language and non-verbal communication: eye contact, gestures, sitting position Protects patient's modesty Requests a chaperon Uses suitable terms to address the patient Establishes patient's understanding of the diagnosis	Talks only to the family, not to the patient Dismisses patient's symptoms Dismisses patient's emotions Uses medical jargon Causes pain during examinations Reports wrong findings Reports findings from examination / procedures which are not done Is patronising towards patients Raises unrealistic expectations Closes consultations abruptly	Does not introduce oneself Fails to ask relevant questions Does not ask for symptoms of metastasis Does not ask permission from the patient before performing physical examination Does not carry out the relevant examination e.g., per-rectal examination for a patient with rectal cancer Misses obvious signs or findings Does not review relevant documents & investigation results Does not ask if the patient or family have any questions or concerns

Assessment / Evidence

1. Entrance evaluation - MCQ (MedEx), OSCE
2. Workplace-based assessment (WBA) - CBD
3. Part Two Examination: MCQ, COQ, CSC, OSCE

ELA 2: Assessment and initial management of pain

Entry Essential Learning Activity 2	
Activity	Assessment and initial management of pain
Description	Identify pain, type and severity of pain, assess the cause, start or modify analgesics and manage potential side effects of analgesics.

All items on the table below are examples, they do not constitute an exhaustive list in any aspect

Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Types of pain Anatomy relevant to pain e.g., dermatome Causes /pathophysiology of pain Basic pharmacology of analgesics Investigations in a patient with pain Pain score WHO analgesic ladder	Reassure the patient Assess and score pain level Assess impact of pain on patient's functions Take pain and drug history Carry out the relevant examination Determine the cause of pain Prescribe treatment Manage the side effects of analgesics Administer analgesics in acute setting Formulate plan to assess/monitor analgesic response	Empathy Thorough Confident Patient

Examples of Behaviours

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Takes drug history Examines patient gently Asks about the impact of pain on activities of daily living Prescribes appropriate medication Explains how to take analgesics Explains the side effects	Causes pain to the patient Scores pain level wrongly Dismisses patient's pain Conducts an inadequate examination	Misses important signs Misses co-morbidities affecting analgesic selection Does not prescribe supportive treatment for analgesic side effects Does not arrange the relevant investigation Does not have a clear plan to monitor pain control

Assessment / Evidence

1. Entrance evaluation - MCQ (MedEx), OSCE
2. Workplace-based assessment (WBA) - CBD
3. Part Two Examination: MCQ, COQ, CSC, OSCE

ELA 3: Management of severe infection

Entry Essential Learning Activity 3	
Activity	Management of severe infection
Description	Identify, assess and manage patients with severe infection especially from febrile neutropenia induced by chemotherapy

All items on the table below are examples, they do not constitute an exhaustive list in any aspect

Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Causes/sources of infection Common infective organisms Co-morbidities which may aggravate the infection Relevant investigations Febrile neutropenia Line-related infection Septicaemic shock Antimicrobials and resistant organisms Hand hygiene and infection control policy Antibiotic guidelines	Elicit signs Identify source Assess severity Arrange relevant investigations Take blood culture Institute prompt treatment Escalate level of care Choose route of antibiotic administration	Thorough Sense of urgency Responsible Trustworthy Teamwork and collaboration Attentive

Examples of Behaviours

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Performs thorough assessments Looks for the cause of infection Arranges septic work up Initiates immediate treatment Escalates care when required Takes history of allergy Reviews vital signs Involves other relevant teams	Attends to the patient too slowly Performs aseptic technique poorly Prescribes antibiotics incorrectly	Misses important physical signs Does not take blood culture from indwelling catheter site /chemoport Does not follow isolation procedures Fails to review investigation results

Assessment / Evidence

1. Entrance evaluation - MCQ (MedEx), OSCE
2. Workplace-based assessment (WBA) - CBD
3. Part Two Examination: MCQ, COQ, CSC, OSCE

ELA 4: Diagnosis and initial treatment of thromboembolic event

Entry Essential Learning Activity 4	
Activity	Diagnosis and initial treatment of thromboembolic event
Description	Identify, assess and manage a thromboembolic event

All items on the table below are examples, they do not constitute an exhaustive list in any aspect

Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Diagnosis Aetiology Risk factors Anatomy of the vascular system Symptomatology Investigations Types of thromboembolic event Treatment options Resuscitation	Formulate differential diagnoses Arrange relevant investigations Start appropriate anticoagulant Assess cardiovascular status Check for interaction of anticoagulant with patient's other ongoing medications including chemotherapy Formulate plan to monitor treatment	Thorough Responsive Sense of urgency Teamwork and collaboration

Examples of Behaviours

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Arranges investigations promptly Escalates level of care as indicated Involves the relevant teams Discusses the potential risks of anticoagulation	Makes a wrong diagnosis Prescribes wrong dose of anticoagulant Starts treatment too slowly	Does not establish risk factors Misses important clinical signs Does not monitor anticoagulant use Does not inform patient about duration of treatment Does not check for possible drug interaction especially with systemic therapy

Assessment / Evidence

1. Entrance evaluation - MCQ (MedEx), OSCE
2. Workplace-based assessment (WBA) - CBD
3. Part Two Examination: MCQ, COQ, CSC, OSCE

ELA 5: Initial management of acute upper gastrointestinal bleeding

Entry Essential Learning Activity 5		
Activity	Initial management of acute upper GI bleeding	
Description	Diagnose, assess and manage patients with acute upper GI bleeding	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Diagnosis Aetiology Risk factors Symptomatology Anatomy of the potential source of bleeding Investigations Comorbidities Pathophysiology Complications Management Resuscitation	Ascertain the source of bleeding Assess severity of condition Start acute management and resuscitation Arrange appropriate investigation Interpret results Establish good venous access	Steady Sense of urgency Teamwork and collaboration Thorough Responsive Leadership
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Stabilises the patient Takes prompt action Refers patient to surgical and intensive care teams urgently Corrects coagulopathy Remains calm	Gives incorrect fluid regimen Allows the patient to continue oral intake Panics	Does not perform per rectal examination Does not recognise potential iatrogenic causes Does not withhold regular medications that may cause bleeding Does not insert nasogastric tube
Assessment / Evidence		
1. Entrance evaluation - MCQ (MedEx), OSCE 2. Workplace-based assessment (WBA) - CBD 3. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 6: Initial management of hypercalcaemia

Entry Essential Learning Activity 6		
Activity	Initial management of hypercalcaemia	
Description	Diagnose, assess and manage hypercalcemia	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Diagnosis Causes Risk factors Symptomatology Investigations Pathophysiology Calculation of corrected serum calcium Treatment	Assess severity Arrange relevant investigations Start optimal hydration regimen Monitor fluid balance Establish cause Monitor treatment response Formulate further management	Sense of urgency Thorough Responsible Reliable
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Prescribes optimal hydration promptly Monitors fluid balance daily Monitors calcium level Monitors symptoms	Causes fluid overload Arranges wrong investigation Calculates calcium level wrongly Prescribes wrong dose of bisphosphonate	Does not establish cause of hypercalcemia Does not determine whether patient is on calcium supplement Does not advise patient on appropriate precautions to avoid future events
Assessment / Evidence		
1. Entrance evaluation - MCQ (MedEx), OSCE 2. Workplace-based assessment (WBA) - CBD 3. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 7: Management of acute hypersensitivity reaction

Entry Essential Learning Activity 7	
Activity	Management of acute hypersensitivity reaction
Description	Diagnose, assess and manage acute hypersensitivity reaction especially during chemotherapy infusion

All items on the table below are examples, they do not constitute an exhaustive list in any aspect

Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Diagnosis Causes Risk factors Symptomatology Investigations Types of reaction Pathophysiology Treatment Resuscitation	Prompt diagnosis, stop offending drug immediately Assess severity Determine the cause Perform basic resuscitation including CPR* Administer rescue drugs appropriately Manage team members	Steady Sense of urgency Leadership Teamwork and collaboration Responsive

Examples of Behaviours

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Performs ABC* assessment Gives oxygen Establishes good venous access Gives clear instruction to support staff Ensures resuscitation trolley is at the bedside Discontinues potential causative agents	Panics Responds too slowly Performs inadequate resuscitation Gives inappropriate treatment	Does not recognise relevant signs Does not monitor vital signs Does not escalate care when required Does not refer to other supporting teams in timely manner

Assessment / Evidence

1. Entrance evaluation - MCQ (MedEx), OSCE
2. Workplace-based assessment (WBA) - CBD
3. Part Two Examination: MCQ, COQ, CSC, OSCE

*CPR - Cardiopulmonary resuscitation

*ABC - Airway breathing circulation

Appendix 2: Knowledge and Skill Competence Level

2-1		
Level	**Anatomy – Head and neck**	**Knowledge**
1	Some knowledge of different head and neck sites	
2	Knows the common head and neck cancer tumour sites and their respective areas of local spread	
3	Knows the head and neck tumour sites and subsites and their respective areas of locoregional spread including the lymph node drainage areas of specific sites	
4	Knows in more detail all the subsites of head and neck cancers, their potential areas of spread, as well as the surrounding normal structures/organs	
5	Able to locate head and neck sites, tumours, areas at risk of spread including nodal stations on x-ray images, or by surface anatomy or bony landmarks of the patient, and on the CT/MRI images	
6	Able to identify all the areas of spread on CT or MR images, knows the areas of potential spread including the nodal stations and how to apply this knowledge to produce optimal radiation fields or for contouring/localisation of the target areas and organs at risk	
2-2		
Level	**Cancer Biology – The cell cycle**	**Knowledge**
1	Awareness of the (mammalian) cell cycle	
2	Knows the different phases of the cell cycle	
3	Knows the function of the different phases of the cell cycle	
4	Understands the factors and molecular pathways that regulate the cell cycle	
5	Understands factors that can dysregulate the cell cycle control leading to cancer formation	
6	Understands the rationale underlying therapeutic targets in relation to cell cycle in the treatment of cancer	
2-3		
Level	**Cancer Pathology - Lung cancer**	**Knowledge**
1	Knows clinical signs and symptoms	
2	Knows epidemiology, aetiology and risk factors	
3	Knows of precancerous conditions, different types of lung cancers and histologic classifications	
4	Understands natural history of disease including patterns of spread and prognosis of different subtypes	
5	Knows the morphologic, histopathologic and molecular features that are specific for lung cancer	
6	Application of histopathological features, biomarkers in treatment selection	
2-4		
Level	**Medical statistics- Survival Analyses**	**Knowledge**
1	Aware that survival is an endpoint.	
2	Knows of the different endpoints.	
3	Knows the principles governing the statistical analysis	
4	Able to apply the appropriate statistical tools for analysis	
5	Able to interpret and evaluate the results	
6	Able to discuss and critically appraise the results for clinical application.	

2-5		
Level	**Pharmacology – Alkylating agents**	**Knowledge**
1	Aware that these are cytotoxics	
2	Knows of various alkylating agents (classification)	
3	Understands the general mechanisms of action	
4	Understands the mechanism of action, pharmacokinetics and pharmacodynamics of individual drugs including drug resistance	
5	For individual drugs, knows the clinical indication, typical dose prescription and scheduling, as well as toxicity profile	
6	For individual drugs, knows the precautions, dose limiting factor, drug interaction and toxicity management	
2-6		
Level	**Radiobiology - Fractionation**	**Knowledge**
1	Awareness of radiation fractionation	
2	Knows of various fractionation regimes for different indications	
3	Understands the principles of fractionation	
4	Understands the rationale of altered fractionation regimes	
5	Selects the correct formula for application. Applies knowledge of fractionation to clinical situations appropriately	
6	Knows how to calculate to compensate for doses for missed treatments, error in treatment, retreatment, biologically equivalent protocols	
2-7		
Level	**RT Physics - Radiation therapy machine**	**Knowledge**
1	Awareness of radiation therapy machine	
2	Knows of different types of machines	
3	Knows the main components of the machines	
4	Understands the function of the main components of the machine	
5	Knows the clinical utility of the various machines	
6	Knows advantages and disadvantages of the different machines for a given clinical situation	
2-8		
Level	**Tumour Site – Breast Cancer**	**Knowledge**
1	Has general knowledge of signs & symptoms	
2	Know diagnostic, staging work up and classification	
3	Knows treatment options – systemic therapy, radiotherapy and other therapies	
4	Understands treatment indications and toxicity management	
5	Knows individual patient management, prognosis and treatment outcomes	
6	Knows how to manage complex and rare situations, advanced techniques, emerging therapies	

2-9		
Level	**Tumour Site - Managing Breast Cancer**	**Skills**
1	Able to elicit symptoms and signs	
2	Able to assess disease extent and patient fitness for treatment Able to interpret relevant documents and investigation results	
3	Able to formulate initial treatment options Able to take consent for treatment	
4	Able to discuss treatment details and toxicities Able to implement treatment as prescribed	
5	Able to make decision on treatment Able to plan and executes treatment Can verify radiotherapy treatment Able to assess and manage treatment toxicities Able to assess treatment response	
6	Can manage complex situations e.g. recurrences, re-irradiation independently or with minimal support	
2-10		
Level	**Oncology Emergency – Febrile Neutropenia**	**Knowledge**
1	Knows clinical signs and symptoms	
2	Knows the pathophysiology	
3	Knows patient and treatment-related risk factors	
4	Knows of the risk based on the various systemic therapy regimens and severity grading classification	
5	Knows how to diagnose, investigate, assess severity and treat including the use of antibiotics, GCSF and other supportive treatment. Knows local antibiotic guidelines	
6	Knows how to manage complex cases including when to escalate care	
2-11		
Level	**Oncology Emergency - Febrile Neutropenia**	**Skills**
1	Demonstrate skills in eliciting symptoms and signs	
2	Able to diagnose	
3	Able to assess severity and arrange investigations	
4	Conducts prompt initial treatment	
5	Able to manage patients comprehensively Able to assess risks for complications and monitor appropriately	
6	Can manage complex situations and escalate care appropriately Makes plans for preventive measures to reduce risks of future occurrence	
2-12		
Level	**Palliative care - Analgesia**	**Knowledge**
1	Knows how to recognise and assess pain	
2	Knows the pathophysiology of pain	
3	Knows how to prescribe analgesics	
4	Knows how to titrate and optimise drug doses	
5	Knows the WHO pain ladder, drug side effects and management of toxicities Knows and able to apply Clinical Practice Guideline (CPG) recommendations	
6	Management of complex cases including referral for advanced pain Management techniques e.g., nerve blocks, ketamine infusions etc	

2-13		
Level	**Palliative care - Analgesia**	**Skills**
1	Demonstrates skills in eliciting signs and symptoms of pain	
2	Able to score pain and diagnose the different types of pain	
3	Able to counsel patients about the choice of analgesics, route of administration, side effects	
4	Able to conduct initial treatment	
5	Able to manage patients comprehensively, assess risks for complications and monitor appropriately	
6	Able to manage complex situations and escalate care appropriately.	
2-14		
Level	**Soft Skills - Breaking Bad News for Recurrent Disease**	**Knowledge**
1	Recognises a situation as bad news.	
2	Able to prepare the setting and assess patients' background knowledge and expectation.	
3	Break the news with appropriate body language (e.g., eye contact) and use language that is easy to understand.	
4	Able to communicate on the prognosis and future treatment plan.	
5	Give patients/family opportunity to ask questions and respond appropriately.	
6	Able to empathize and manage patient's and family's emotions adequately.	
2-15		
Level	**Treatment Assessment - Toxicities**	**Knowledge**
1	Knows potential treatment related toxicities	
2	Knows the pathophysiology	
3	Knows patient and treatment related risk factors	
4	Knows of the toxicities related to the various treatment regimens and severity grading classification	
5	Knows how to diagnose, investigate, assess severity and treat toxicities	
6	Management of complex cases including when to escalate care	
2-16		
Level	**Treatment Assessment- Toxicities**	**Skills**
1	Demonstrates skills in eliciting symptoms and signs	
2	Able to recognise common treatment related toxicities	
3	Able to assess severity and arrange investigations.	
4	Able to conduct prompt initial treatment	
5	Able to manage patients comprehensively and monitor appropriately	
6	Able to manage complex situations and escalate care appropriately. Able to modify or change treatment regimens to prevent future occurrences	

Appendix 3: Radiotherapy Physics

Basic physics relevant to radiotherapy
Basic Physics Atomic structure, atomic and mass numbers Electron shells and energy levels Electromagnetic radiation Electromagnetic spectrum Energy quantification Relationship between wavelength, frequency and energy Basics of production of x- or gamma-rays Description of an x- or gamma-ray beam (quality, energy, intensity, size) Continuous and discrete spectra Attenuation, absorption, scattering of x-rays Attenuation coefficients, half value layer Electromagnetic radiation and its interaction with matter Elastic scattering Compton effect Photoelectric effect Pair production Photonuclear interactions Auger effect Scattered radiation Secondary electrons Range versus energy Linear energy transfer Interaction of sub atomic particles with matter Ionisation and excitation due to charged particles Electrons • collision loss, radiative loss • stopping power due to each and total stopping power • particle range Bragg peak Bremsstrahlung Neutrons: elastic and inelastic collisions Protons, ionisation profile Elementary knowledge of pions and heavy ions

Radiation Dosimetry

Radiation Dosimetry I
- Concept of absorbed dose
- Definitions and units
- Variation of absorbed dose in different tissues and materials
- Concept of exposure and KERMA
- Simple introduction to the relationship between exposure, KERMA and absorbed dose
- Ionisation in gases

Radiation Dosimetry II
- Elemental knowledge of the construction, advantages and disadvantages of the following:
- ionisation methods (ionisation chamber, Geiger counter, diodes)
- chemical methods, primarily films
- thermoluminescence (TLD)
- scintillation counters
- calorimetry

Radiation Dosimetry III
- Calibration methods
- intercomparisons
- standards (local and national)
- corrections (temperature, pressure, beam direction etc)
- constancy checks
- beam calibration protocols
- Practical dose measurements
- introduction to the derivation of isodose curves
- central axis depth dose profiles

Beam Therapy Equipment

Beam therapy equipment I - cobalt, kV X-rays
- Principles of superficial and orthovoltage x-ray production
- Basic construction of a cobalt machine

Beam therapy equipment II - linear accelerators (LINAC)
- Principles of the linear accelerator
- Basics of the following:
- microwave production
- wave guide construction
- electron beam production
- x-ray production, beam control and stability
- Output
- Concept and definition of the isocentre
- source size
- defining the beam geometry: collimators, applicators, multileaf collimators, cast blocks, penumbra,
- factors influencing penumbra
- defining the beam quality
- wedges and applicators: types, construction, action, use and effect on depth dose
- shielding: techniques, materials, transmission, scatter, doses under shields
- Irradiating the target
- the treatment couch
- positioning the patient
- lasers
- pointers
- light fields
- monitoring radiation output
- control of the accelerator
- Multileaf collimators: edge definition, leaf leakage, influence of leaf size

Photon beam physics
- Energy ranges
- Build up and skin sparing for x-rays
- Isodose curves for x-rays
- Fixed FSD and isocentric approaches
- Principles of wedges
- Wedge angle
- Trays
- Output factors
- Beam geometry
- magnification and penumbra
- field size definition

Electron beam physics
- Electron beams used in clinical practice
- Energy ranges
- Percentage depth dose
- Factors affecting depth dose
- Build up and skin sparing for electrons
- Isodose curves for electrons
- Effects of surface obliquity and in-homogeneities on dose distributions
- Internal shielding

Treatment Planning

Treatment planning, I
- Data required for treatment planning
- Immobilisation (techniques and accuracy)
- Effects and minimisation of patient and organ movement
- Tumour localisation: direct visual, simulator, CT, MRI, ultrasound
- Separation and contour information (uni-planar, multi-planar)
- Transposition of patient data: magnification, target volumes, sensitive structures, dose modifying structures
- Structure and use of a simulator
- Use of a CT scanner/CT simulator in radiotherapy planning
- Principles of CT treatment planning
- acquisition of data and data transfer
- image manipulation and image fusion
- defining the volume, growing tools
- beam placement using beam's eye view

Treatment planning II
- Fixed FSD versus isocentric planning
- Coplanar planning in a uniform medium
- Isodose distributions in each of the following situations, their uses and critical assessment:
- single field
- isodose summation
- multi-field planning
- weighting
- Tissue compensators
- Surface obliquity
- Inhomogeneous media
- Field matching
- Basics of dose calculations in the presence of extensive shielding (e.g., sector or Clarkson integration), plan verification and evaluation using isodose display, dose volume histograms (DVH) and digitally reconstructed radiographs (DRR)

Treatment planning III
- Principles of conformal therapy
- Principles of arc and rotational therapy
- Principles of non-coplanar planning
- Principles of stereotactic localisation
- Total body irradiation (TBI)
- Volume definition (various methods including ICRU 50, 62, 83 etc.)
- Dose prescription (various methods including ICRU 50, 62, 83 etc.)

Advanced techniques
IMRT, VMAT, SRS, SRT, SABR, IGRT etc.
Radioactivity
Basic radioactivity Types of radiation and radioactive decay isotopes Concepts, definitions and units of activity and half-life. characteristics of radiation parent and daughter decay series radioactive equilibrium sealed and unsealed sources
Radioactive sources I – unsealed sources Isotopes Stability, shelf life Physical v biological half life Radiopharmaceuticals Use in imaging and therapy Clinical applications and dose calculations Radioactive sources II – sealed sources Specific forms of sources and their construction (wires, hairpins, seeds, tubes, needles, ovoids, etc) Requirement for clinical sealed sources Inverse square law Specifications of source strength, air KERMA rate Calculation of absorbed dose from a source Dose distributions around standard sources Hazards with sealed sources Control and testing of sealed sources Measurement of activity Storage and movement control Source handling, issue Leak testing, inspection Safety devices
Brachytherapy
Principles of clinical use Distribution rules and dose calculation basis for Paris system Gynaecological intra-cavitary brachytherapy systems, source and dose distributions Dose specification Principles of after-loading Types of after-loading (manual, remote, low, intermediate and high dose rate)

Radiation Protection
Radiation protection I Radiation risks Stochastic and non-stochastic processes Quality factors and dose equivalent Background radiation Low level exposure effects Radiation Protection Criteria and Exposure Control (ICRP, IAEA) Dose limits Statutory framework Regulatory Agencies and Legislation (NCRP, NRPB and AELB) IRR 1999 Guidance Notes IR(ME)R 2000 Local Rules Radiological Accidents and Emergencies Regulation and Licensing Requirement for the Use of Radiation in Medicine
Radiation protection II Classification of staff, designated areas Dose limits Controlled areas and screening Protection mechanisms: time, distance, shielding Monitoring of personnel: construction and operating of film badge, TLD badge, direct reading dosimeter Dose reporting mechanisms and dose levels
Radiation protection III Design of radiotherapy treatment rooms Primary/secondary barriers Transmission through barriers, elementary calculations Mazes, doors and interlocks Leakage and scattered radiation Design of sealed sources
Commissioning and quality assurance of LINACs
Definition of quality assurance and quality control Writing and implementing the radiotherapy prescription The role of computer verification Manual checking Monitoring accuracy of treated volume: verification films and mega-voltage imaging Monitoring accuracy of positioning (laser, light-fields, mechanical pointers, tolerances) Monitoring accuracy of radiation output: symmetry and field flatness (tolerances) Legal requirements

Appendix 4: Patient Assessment

Components	Rationale and Examples
History and physical examination	Meticulous history-taking and physical examination to confirm symptoms and signs of disease so they can be managed adequately and monitored for changes during the course of therapy
Co-morbidities and fitness level	Confirm suitability for treatment. Some medical conditions may require optimisation prior to commencement of oncological intervention. Performance status: ECOG, Karnofsky.
Family history	Assess if there is significant genetic basis for cancer and possibility for genetic counselling and tests.
Socioeconomic status	Coordinate access to social and financial support May require referral to social worker, occupational therapist, physiotherapist etc.
Tissue diagnosis	Appropriate biopsy technique(s) and investigation(s) to confirm diagnosis and markers that may guide therapy e.g., HER2 status and the role of HER2-targeted therapy.
Biomedical imaging	Relates clinical and radiological anatomy to diagnosis and therapy, aids staging. Use of appropriate staging system is important. Examples: CT scan, MRI scan, PET scan etc.
Haematology and blood biochemistry tests	Assessment of fitness for treatment, staging, prognostication and response assessment
Other organ function tests	Assessment of baseline function, fitness for treatment and monitoring of complications Examples: echocardiogram, lung function test
Treatment intent and options	Recognises when radical or palliative treatments are appropriate, and risk/benefit of available treatment options as tailored for the patient
Prognostication	Assess the effect of PS, stage, age, comorbidity, histological type and other prognostic factors on outcome.
Socioeconomic status	Coordinate access to social (e.g., social worker, occupational therapist, physiotherapist etc.) and financial support.

Appendix 5: Treatment Assessment

Components	Rationale and Examples
Response to treatment	Where applicable this can be accessed via physical examination, radiological assessment, symptom(s) improvement, blood biochemistry and concluded by using specific response criteria e.g., RECIST etc.
Treatment-related toxicities	CTCAE grading system for systemic therapy side -effects, RTOG grading system for radiation therapy side-effects etc. Able to distinguish between acute vs late toxicity and institute precautionary measures especially in patients who are at higher risks of severe toxicity.

Appendix 6: Exit Level ELAs

ELA 1: Formulating a treatment plan

Exit Essential Learning Activity 1		
Activity	**Formulating a treatment plan**	
Description	Formulating a treatment plan, taking into consideration a patient's co-morbidities, performance status, preference, socioeconomic background	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Treatment options of the different tumour types Assessment of patient performance status, comorbidity, social, financial and logistic aspects in patient care Multidisciplinary discussion Evidence based medicine Value based medicine	Diagnose the patient accurately Assess patient's comorbidities, performance status, medication history accurately Tailor the treatment plan accordingly Communicate effectively with good verbal and non- verbal skills Formulate a safe, holistic treatment plan Explain situation, prognosis and treatment plan to patient and family	Courteous Empathetic Thorough Confident
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Shows good eye contact Faces the patient during consultation Clarifies the relationship between the patient and accompanying persons Asks if the patient/family has any questions/concerns Establishes patient's understanding of the diagnosis	Involves relatives only in the consultation Rushes the consultation Uses medical jargon Reports findings of examination/procedures which were not done Raises unrealistic expectations Ends the consultation abruptly	Does not introduce self Fails to ask relevant questions Does not consider patient's preference or socioeconomic background in the treatment decision
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 2: Treating patients with external beam radiotherapy (EBRT)

Exit Essential Learning Activity 2		
Activity	**Treating patients using external beam radiotherapy (EBRT)**	
Description	Preparing patient for simulation, contour target volumes and organs at risk (OAR), evaluate radiotherapy treatment plans, interpret dose volume histograms etc.	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Indications Pre-treatment patient preparation and optimisation Radiotherapy techniques - 2D, 3D, IMRT, stereotactic Dose prescription Palliative radiation doses considering the clinical situation, Patient factors, logistics Simulation process- patient positioning, immobilisation, localisation, image acquisition Planning process- image fusion, contouring, prescription point, beam arrangement, beam modification, dosimetry Plan evaluation- isodose coverage, organ at risk constraints, Dose Volume Histograms Treatment delivery and verification Management of systematic and random errors RTOG toxicity grading criteria CTCAE toxicity grading criteria LENT-SOMA scale Radiation quality assurance and quality control. ICRU reference – ICRU 50, 63, 83 QUANTEC Emami organ at risk tolerances Radiobiological principles and concepts in treating previously radiated sites Basic sciences - Anatomy, radiological anatomy, radiotherapy physics, radiobiology, cancer pathology, medical statistics	Identify suitable patients for radical treatment Take informed consent- treatment intent, benefit vs risk, treatment process and schedule, side effects, compliance Prepare patients for simulation and radiotherapy Select appropriate radiation technique, dose fractionation, verification method Target volume delineation Organ at risk contouring Interpret images for contouring Evaluate treatment plans Identify problems and errors in radiotherapy treatment plans Interpret dose volume histograms Prescribe radiotherapy Review treatment verification images and act accordingly Manage treatment related issues	Precise Thorough Meticulous Good time management Sense of urgency Organised Efficient

Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Explains the radiotherapy processes thoroughly Explains potential side effects and outcomes of treatment Prescribes radiotherapy dose appropriately Prescribes appropriate concurrent chemotherapy Completes radiotherapy plans in a timely manner Reviews patient on set on first fraction in relevant cases	Prescribes radical radiotherapy in an unfit patient Contours target wrongly Uses inappropriate position during simulation Exceeds Organ at Risk (OAR) radiation dose tolerances Reviews the 95% isodose only Uses incorrect beam matching Delays in side effect management	Does not review DVHs before approving RT plans Does not review axial slice isodoses Contours without referring to HPE/ radiology imaging Does not consider previous treatment history Does not compensate for treatment gaps Misses side effects
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 3: Treating patients with brachytherapy

Exit Essential Learning Activity 3		
Activity	**Treating patients with brachytherapy**	
Description	Preparing patient, insert applicators, contour target volumes and OARs, evaluate treatment plan.	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Principles of brachytherapy Knowledge on the different types and methods of applicator insertion Planning, dose optimisation and plan evaluation Management of acute and late side effects Retreatment issues Image Guided Brachytherapy (IGBT)	Identify patients suitable for treatment Take informed consent- treatment intent, benefit vs risk, treatment process and schedule, side effects, compliance etc. Choose the most suitable method of brachytherapy Prescribe an appropriate dose of radiation Manage side effects appropriately	Meticulous Thorough Good time management Organised Efficient
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Gives comprehensive explanation on treatment indication, process, likely outcomes and toxicities Reviews patients during and after treatment to assess acute and late side effects Reassures patient during the procedure	Handles patient roughly Chooses wrong applicator size Provides inadequate pain control during applicator insertion Prescribes at wrong prescription point Contours wrongly	Misses advice regarding bowel and bladder preparation prior to procedure Does not check applicator size in treatment plan Does not review the case before procedure
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 4: Treating patients with chemotherapy

Exit Essential Learning Activity 4		
Activity	**Treating patients with chemotherapy**	
Description	Managing patients for chemotherapy	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Indications for chemotherapy Treatment intent Informed consent taking Patient preparation and optimisation prior to chemotherapy Classification of chemotherapy Principles of administration and prescribing Safe handling of cytotoxics Chemotherapy dose calculation Delivery methods Side effects and its management Drug interaction Toxicity grading: CTCAE Response assessment ▪ RECIST etc. Chemotherapy in special circumstances – pregnancy, organ dysfunction, HIV, hepatitis Sequencing/combinations Chemotherapy protocols ▪ international guidelines ▪ local protocols Evidence based medicine Value-based medicine	Ascertain patient suitability for chemotherapy Select appropriate regimes Take informed consent- treatment intent, benefit vs risk, drug schedule and administration, side effects, compliance etc. Evaluate venous access Prescribe chemotherapy Tailor choice of chemotherapy to patient comorbidities, preference, socioeconomic background Manage drug interactions and side effects Assess response /benefit of treatment	Precise Thorough Meticulous Caring Organised Efficient Empathetic
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Calculates chemotherapy doses correctly Prescribes appropriate pre-medication and other supportive treatment	Overlooks patient's general condition in determining treatment Prescribes inappropriate regimens in high-risk patients Manages side effect wrongly	Does not take informed consent Does not assess tumour response to treatment

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Modifies or withholds treatment appropriately Discusses fertility sparing options/ contraception Selects appropriate tools for response assessment Shows ability to work with multidisciplinary team Speaks clearly Uses layman term Shows good eye contact Answers questions appropriately	Gives unrealistic outcome expectation Disregards patient's needs and preference in treatment decision. Rushes the patient Gives wrong explanation	Does not counsel for venous access device upfront in someone with poor venous access Does not check patient's pregnancy status prior to starting treatment Does not explain the side effects Does not confirm patient's understanding Does not explain to patients what to do when there are side effects Does not consider logistics
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

CTCAE: Common terminology criteria for adverse events

RECIST: Response evaluation criteria is solid tumours

ELA 5: Treating patients with targeted therapy and immunotherapy

Exit Essential Learning Activity 6		
Activity	**Treating patients with targeted therapy and immunotherapy**	
Description	Managing patients on targeted and immunotherapy	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Tumour biology Predictive biomarkers Signal transduction pathways Cancer immunology Classification of drugs Mechanism of action Side effects including irAE Response assessment -irRECIST Targeted therapy and immunotherapy in special circumstances – pregnancy, organ dysfunction, HIV, hepatitis, immune disorders Evidence based medicine Value-based medicine	Evaluate patient suitability for treatment Take informed consent- treatment intent, benefit vs risk, drug schedule and administration, side effects, compliance etc. Assess and manage side-effects Evaluate tumour response Evaluate clinical benefit and quality of life	Empathy Attentive Meticulous
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Prescribes appropriate dose Explains clearly on drug schedule, efficacy and side effects. Conducts appropriate investigations Evaluates treatment response using appropriate tools	Modifies dose wrongly Manages adverse events sub-optimally Prescribes wrong drug Interprets treatment response wrongly Assesses treatment response too early/ too late	Does not examine for side effects Does not recognise side effects Misses patient's co-morbidities
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

irAE: Immune-related adverse events

irRECIST: Immune-related response evaluation criteria is solid tumours

ELA 6: Treating patients with hormonal therapy

Exit Essential Learning Activity 6		
Activity	Treating patients with hormonal therapy	
Description	Managing patients on hormonal therapy	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Pathophysiology of hormone mediated carcinogenesis Categories of hormonal therapy Pharmacological principles of therapy Clinical indications for therapy Appropriate sequencing with chemotherapy Tumour response assessment Drug interactions Adverse events management Evidence based medicine Value based medicine Hormonal therapy in special circumstances – pregnancy, organ dysfunction, HIV, hepatitis	Assess patient for therapy Select appropriate drug Explain to the patient regarding treatment, benefit vs risk, potential adverse events, precautions etc. Manage adverse events and complications Assess treatment response clinically and radiologically	Thorough Meticulous Caring
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Prescribes appropriate dose Explains clearly on drug schedule, efficacy and side effects. Conducts appropriate investigations Evaluates treatment response using appropriate tools	Modifies dose wrongly Manages adverse events sub-optimally Prescribes wrong drug Gives inappropriate follow-up schedule Interprets treatment response wrongly Assesses treatment response too early/ too late	Does not check menopause status Does not recognise side effects Misses patient's co-morbidities
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 7: Treating patients with other treatment modalities

Exit Essential Learning Activity 7	
Activity	**Treating patients with other treatment modalities (RFA, PRRT, SIRT, RAI, TACE, Cryotherapy)**
Description	Managing patients with other treatment modalities

All items on the table below are examples, they do not constitute an exhaustive list in any aspect

Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Indications, methods of delivery, side effects of other treatment modalities: - Radioiodine ablation/therapy (RAI) - Chemoembolisation including transarterial chemoembolisation (TACE) - Radiofrequency ablation (RFA) - Cryotherapy - Peptide receptor radionuclide therapy (PRRT) -Selective internal radiation therapy (SIRT) Properties of radionuclides Principles of RFA and cryotherapy Principles of dose and dosimetry Principles of radiation protection Objectives of the therapy in terms of its efficacy, likely outcomes, cost and impact on quality of life.	Assess patient's needs and indications for therapy Discuss treatment options with patients Recognise and manage toxicities and side effects Assess treatment response Interpret evidence relevant to the patient's situation and treatment approach Conduct multidisciplinary team discussion Explain situation, prognosis and treatment plan to patient and family	Thorough Meticulous Caring Organised Open mindedness

Examples of Behaviours

Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Considers patients age, social and logistic factors in treatment decision Manages systematically Acts promptly in treatment-related emergency situations Shows ability to work with multidisciplinary team	Disregards patient's needs and preference Assesses patient inappropriately Chooses inappropriate patient / modality selection	Does not recognise complications and side effects Does not check patient's pregnancy status prior to starting treatment

Assessment / Evidence

1. Workplace-based assessment (WBA) - logbooks, CBD, IBA
2. Part Two Examination: MCQ, COQ, CSC, OSCE

ELA 8: Managing emesis related to cancer therapy

Exit Essential Learning Activity 8		
Activity	**Managing emesis related to cancer therapy**	
Description	Managing patients with chemotherapy-induced nausea & vomiting (CINV) and emesis related to other systemic therapy and radiotherapy	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Emetogenic risk of chemotherapy Radiation induced emesis Classification of emesis Types of anti-emetics Toxicity grading Guidelines - National & international Basic science - Pharmacology of anti-emetics - Pathophysiology of emesis	Assess severity of emesis Prescribe emesis prophylaxis and rescue therapy Assess emesis related complications – e.g., dehydration, electrolyte imbalance	Empathetic Thorough Meticulous
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Recognises/anticipates emesis Elicits presence of emesis Assesses severity of emesis Modifies anti-emetic regimens accordingly Explains side-effects of anti-emetics and measures to overcome these	Prescribes prophylactic drugs not suitable for the expected level of emesis Prescribes wrong dose of anti-emetics Grades severity wrongly	Does not give opportunity for patients to describe symptoms Does not assess hydration status Does not grade the severity of emesis Does not prescribe prophylactic anti-emetics when indicated Does not explain risk of emesis during consent
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 9: Palliating common cancer-related complications

Exit Essential Learning Activity 9		
Activity	**Palliating common cancer-related complications**	
Description	Palliation of common cancer-related complications such as pain, tumour bleed, effusions, malnutrition, obstruction, neurological deficit, depression	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Common cancer-related complications such as pain, bleeding, effusion, malnutrition, obstruction, neurological deficits, depression Risk factors for complications Role of anticancer therapies in palliation Role of supportive therapies including non-pharmacologic measures Basic science -Pathophysiology of cancer related complications - Pharmacology of drugs	Retrieve relevant information from patients and families Elicit relevant physical signs Interpret relevant investigation results Diagnose the clinical problem Formulate a treatment plan Refer to other disciplines as indicated Explain situation, prognosis and treatment plan to patient and family	Empathetic Thorough Patient
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard patient care, things a trainee might forget to do
Makes a right diagnosis Acts promptly Gets help from relevant teams	Raises unrealistic expectations	Misses important history or clinical findings Does not inform patient/relatives regarding treatment plan and progress Does not inform prognosis
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 10: Managing oncological emergencies

Exit Essential Learning Activity 10		
Activity	**Managing oncological emergencies**	
Description	Managing patients with oncological emergencies e.g., spinal cord compression, neutropenic sepsis	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Pathophysiology of common Oncological emergencies: - Spinal cord compression - Neutropenic sepsis - SVCO - Tumour lysis syndrome - Hypercalcemia - Brain metastases - Tumour bleed Management	Recognise the condition as an emergency Implement management promptly Arrange relevant investigations Interpret investigations Explain situation, prognosis and treatment plan to patient and family	Thorough Confident Sense of urgency
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Asks relevant symptoms Identifies physical signs Explains the situation to the patient/family clearly Explains the potential outcome/ prognosis Prescribes appropriate supportive treatment Interprets investigations correctly	Gives wrong treatment Raises unrealistic expectations	Does not explain the risk of treatment Does not recognise the urgency of the situation
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

ELA 11: Conducting research activities

Exit Essential Learning Activity 11		
Activity	**Conducting research activities**	
Description	Conducting research activities e.g., audits, prospective studies etc	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Research methodology Research ethics Study design Statistical analysis Scientific writing and presentation Good clinical practice (GCP)	Write research proposal Search literature Perform critical appraisal Submit for ethics approval Collect data Analyse data Discuss results Present data / results	Ethical Thorough Meticulous Perseverance Leadership Innovative
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Adheres to GCP Formulates original research ideas Acknowledges relevant parties Performs good discussion and inference Searches literature independently Appraises literature independently	Falsifies data Manipulates statistics Forces patients to take part Plagiarises report Harms patients Violates clinical protocol Analyses data incorrectly	Does not follow deadlines Does not take informed consent Does not maintain confidentiality
Assessment / Evidence		
1. Continuous assessment - research progress report 2. Final Examination: research report / publication		

ELA 12: Breaking bad news

Exit Essential Learning Activity 12		
Activity	**Breaking bad news**	
Description	Breaking bad news e.g., diagnosis of cancer, disease progression, terminal illness	
All items on the table below are examples, they do not constitute an exhaustive list in any aspect		
Knowledge Know, Facts, Information	**Skill** Do, Practical, Psychomotor, Techniques	**Attitudes + Values** Feel, behaviours displaying underlying values or emotions
Strategy e.g. SPIKES - Setting up the interview - Patient perception - Patient's Invitation - Knowledge and information for the patient - Patient's emotions - Strategy and summary Barriers e.g. - Pre-existing emotional distress - Language and cultural differences - Incomplete information - Clinician unable to handle patient's reaction - Family/ relatives reluctance for disclosure Communication skills - Verbal and non-verbal	Set the scene Arrange for privacy Involve significant carers Assess patient's knowledge and perception Assess patient's readiness to hear bad news Disclose the information to patient and family Address the patient's emotions Summarise the discussion Formulate care plan	Thorough Confident Patient Empathetic Sensitive Honest Realistic
Examples of Behaviours		
Positive Things that should be done, correct techniques or practices, things a trainee might do right	**Negative** Things that should not be done, incorrect techniques or practices, things a trainee might do wrong	**Negative Passive** Things that may be forgotten or omitted that constitute incorrect or substandard care, things a trainee forget to do
Ensures privacy e.g., use a private room, draw curtains Speaks clearly Uses layman terms Answers questions appropriately Ensures patient comfort Manages time constraints and interruptions Makes connection with the patient	Rushes the patient Gives wrong explanation Shows poor eye contact Answers phone call during consultation Stands up while others are sitting down	Does not confirm patient's understanding Does not provide clear plan of care Does not provide summary of discussion Does not allow patients to ask questions Does not show sensitivity to patient's emotions
Assessment / Evidence		
1. Workplace-based assessment (WBA) - logbooks, CBD, IBA 2. Part Two Examination: MCQ, COQ, CSC, OSCE		

Appendix 7: Assessment Checklist

Form 7-1 Checklist for Minimum Cases for Assessment

Trainee:	
Training Number / Centre:	
Date of commencement of training:	

	Subjects	Minimum Number of Cases to Be Reviewed with Supervisors				Remarks (To be completed by end of stated training period)	Number of Cases Completed
		General Skills	RT	Brachy	Systemic		
1	Oncology Emergency	1	1	-	-	By end of Year 1	
2	Palliative Radiotherapy	-	1	-	-	By end of Year 3	
3	Nasopharyngeal Cancer	1	1	-	1	By end of Year 2	
4	Breast & Endocrine	1	1	-	1		
5	Gastrointestinal Tract	-	1	-	1		
6	Cervical Cancer	1	1	1	1		
7	Chest (Lung)	-	1	-	1	By end of Year 3	
10	Genitourinary Tract / Gynae	-	1	-	1		
12	Central Nervous System	1	1	-	-		
13	Musculoskeletal Tumours	-	1	-	1		
14	Skin	-	1	-	-		
15	Paediatric Tumours	-	1	-	-	By end of Year 4	
16	Haematological Malignancies	-	1	-	-		
TOTAL		**6**	**13**	**1**	**7**		

Appendix 8: Logbook

Form 8-1: Oncological Emergencies

SCVO, spinal cord compression, febrile neutropenia, malignant hypercalcaemia, brain metastases, tumour lysis syndrome, bleeding from tumour etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-2: Palliative Radiotherapy

Brain metastasis, bone metastasis, choroidal metastasis etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-3: Radical Radiotherapy – Central Nervous System

Brain, spinal cord, meninges, skull base, peripheral nerves etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-4: Radical Radiotherapy – Head & Neck

Larynx, pharynx, oropharynx, oral cavity, paranasal sinuses, nasopharynx, salivary gland, middle ear, unknown primary etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-5: Radical Radiotherapy – Thorax

Mediastinum, lung, mesothelioma etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-6: Radical Radiotherapy – Breast & Endocrine

Breast, chest wall, thyroid etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-7: Radical Radiotherapy – Gastrointestinal and Hepatobiliary Tract

Oesophagus, stomach, pancreas, rectum, anus etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-8: Radical Radiotherapy – Genitourinary Tract

Prostate, bladder, penis, testis etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-9: Radical Radiotherapy – Gynaecological Tract

Cervix, endometrium, vulva, vagina etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-10: Radical Radiotherapy – Musculoskeletal System

Soft tissue, bone						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-11: Radical Radiotherapy – Paediatric Tumours

CNS tumours, Wilms' tumour, neuroblastoma, rhabdomyosarcoma, leukaemia etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-12: Radical Radiotherapy – Haematological System

Lymphoma, multiple myeloma, leukaemia etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-13: Radical Radiotherapy – Skin

Squamous cell carcinoma, basal cell carcinoma, melanoma etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-14: Radical Radiotherapy – Rare Conditions

Paraganglioma, keloids, haemangioma etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Technique / Dose**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-15: Systemic Therapy – Central Nervous System

Examples of systemic therapy regimens: PCV, temozolomide, ICE, bevacizumab +irinotecan, etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-16: Systemic Therapy – Head & Neck

Examples of systemic therapy regimens: 5-Fluorouracil + cisplatin, TPF, docetaxel, gemcitabine + carboplatin, cetuximab, cisplatin/carboplatin, pembrolizumab, capecitabine, methotrexate etc.

No	Date	Patient's Initial / RN	Hospital	Diagnosis / Systemic therapy Regimen / Line of Treatment	Level of Care (W/P)	Trainer's Signature

W: Whole care, P: Partial care

Form 8-17: Systemic Therapy – Thorax

Examples of systemic therapy regimens: EP, gemcitabine / docetaxel / paclitaxel / vinorelbine / pemetrexed + cisplatin / carboplatin, carboplatin, docetaxel, CAP, TS-one, pembrolizumab, nivolumab, gefitinib, erlotinib, osimertinib, crizotinib, ceretinib etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-18: Systemic Therapy – Breast & Endocrine

Examples of systemic therapy regimens: FEC, FEC-T, EC, FAC, AC, AC-T, TC, CMF, docetaxel, paclitaxel, gemcitabine, carboplatin, trastuzumab, trastuzumab-emtansine, pertuzumab, eribulin, capecitabine, lapatinib, tamoxifen, letrozole, anastrozole, exemestane, everolimus, palbociclib, fulvestrant etc.

No	Date	Patient's Initial / RN	Hospital	Diagnosis / Systemic therapy Regimen / Line of Treatment	Level of Care (W/P)	Trainer's Signature

W: Whole care, P: Partial care

From 8-19: Systemic Therapy – Gastrointestinal & Hepatobiliary Tract

Mayo, ECF, ECX, EOX, FLOT, capecitabine, QUASAR, de-Gramont, FOLFOX, XELOX, FOLFIRI, TS-one, UFT + leucovorin, cetuximab, bevacizumab, panitumumab, regorafenib, aflibercept, ramucirumab, gemcitabine, gemcitabine + nab-paclitaxel, FOLFIRINOX, sorafenib etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-20: Systemic Therapy – Genitourinary Tract

Examples of systemic therapy regimens: BEP, EP, TIP, PEI, VIP, gemcitabine + cisplatin/carboplatin, carboplatin, docetaxel/paclitaxel, MVAC, docetaxel, cabazitaxel, mitoxantrone, sunitinib, pazopanib, everolimus, nivolumab, axitinib, bicalutamide, abiraterone, enzalutamide, LHRH agonist/antagonist etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-21: Systemic Therapy – Gynaecological Tract

Examples of systemic therapy regimens: Cisplatin/carboplatin, 5-Flurouracil / paclitaxel / gemcitabine + cisplatin / carboplatin, liposomal doxorubicin, topotecan, bevacizumab, olaparib etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-22: Systemic Therapy – Musculoskeletal System

Examples of systemic therapy regimens: Doxorubicin, ifosfamide, doxorubicin + ifosfamide, doxorubicin + cisplatin ± methotrexate, VIDE, VAC + IE, ICE, EVAIA, topotecan + cyclophosphamide, gemcitabine, gemcitabine + docetaxel/dacarbazine, MAID, trabectadin, eribulin etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Form 8-23: Systemic Therapy – Skin

Examples of systemic therapy regimens: Dacarbazine, interferon-alfa, pembrolizumab, nivolumab, ipilimumab, vemurafenib, dabrafenib, trametinib, temozolamide, cisplatin-5FU, etc.						
No	**Date**	**Patient's Initial / RN**	**Hospital**	**Diagnosis / Systemic therapy Regimen / Line of Treatment**	**Level of Care (W/P)**	**Trainer's Signature**

W: Whole care, P: Partial care

Appendix 9: Assessment CBD

Form 9: Case-Based Discussion (CBD)

Case Based Discussion - General Clinical Skills

Trainee's Name				**Year of Training**	
Subject				**Diagnosis / Stage**	
Case No				**Date**	

Rating: **S**=Satisfactory **U**=Unsatisfactory **N**=Not observed

	Rating (S/U/N)	Remarks (Areas for improvement)
a) History taking & Physical examination		
b) Investigation: radiology interpretation		
c) Management Plan		
d) Communication skills		
e) Overall clinical competency		
f) Medical Record Keeping		
Additional Comment/ Suggestion		
Additional Assessor's comments		
Trainee's comments		
Trainee's signature	**Assessor's name & signature**	

Appendix 10: Assessment IBA - Radiotherapy

Form 10-1: Intervention-Based Assessment - Radiotherapy (IBA-RT)

Rating: S=Satisfactory U=Unsatisfactory N=Not observed

☐ **External Beam Radiotherapy** **Tumour Site:** _____			
☐ **Brachytherapy** **Tumour Site:** _____			
	Competencies and definitions	**S/U/N**	**Comments**
I	**Consent**		
	Has thorough knowledge of indications and aims of treatment		
	Explains the benefits and side effects		
	Explains the planning and treatment processes		
	Discusses relevant issues e.g., cost, logistics		
II	**Deliberation**		
	Decides on treatment intent, fractionation schedule and urgency		
	Selects radiotherapy technique		
III	**Pre-treatment patient preparation**		
	Optimises patient's condition for radiotherapy e.g., dentition, nutrition		
	Gives relevant special instructions e.g., full bladder, empty rectum, low residue diet, fasting if requires IV contrast		
IV	**Simulation**		
	Determines patient positioning and immobilisation devices.		
	Localises the area to be imaged / irradiated including any special instruction e.g., wire scar		
V	**Contouring**		
	Interprets findings from relevant investigations		
	Delineates target volume		
	Delineates organ at risk		
VI	**Dosimetry and plan evaluation**		
	Reviews beam parameters		
	Evaluates dose distribution and DVH for both targets and OARs		
	Prescribes treatment		
	Gives relevant special instructions		
VII	**Treatment delivery & monitoring**		
	Determines verification protocol		
	Verifies treatment set-up		
	Conducts radiotherapy review		
VIII	**Additional brachytherapy related skills**		
	Prepares patient for applicator		
	Inserts applicator including clean technique, insertion, applicator selection, packing, post-procedural care		

Form 10-1: IBA-RT (continued)

Global Summary			
Level at which completed elements of IBA were performed		**Tick as Appropriate**	**Comments**
1	Insufficient evidence observed to support a judgement		
2	Requires full supervision to perform the intervention		
3	Able to perform the intervention with some supervision		
4	Able to perform the intervention with minimal supervision (will need occasional help)		
5	Competent to perform the intervention unsupervised (can manage complications)		

Additional Comment / Suggestion	
Additional Assessor's comments	
Trainee's comments	
Trainee's signature	**Assessor's name & signature**

Form 10-2: IBA-RT Validation

	Competencies	Satisfactory	Unsatisfactory
I	**Consent**		
	Has thorough knowledge of indications and aims of treatment (IBA-RT)	Identifies suitable patient with correct indication for radical treatment Identifies patients for palliative radiotherapy Identifies patients for re-irradiation	Recommends radical radiotherapy in frail and unfit palliative patient Offers false hope to patient and family Does not elicit history of previous radiotherapy Does not confirm capability of patient to give consent
	Explains the benefits and side effects	Explains to patients and family the potential benefits, acute and late toxicities with their probabilities in layman's language Shows the effort to understand patients' wishes, expectations, concerns and values	Downplays or misses important side effects Magnifies benefit of treatment Not able to explain the risk of declining treatment
	Explains the planning and treatment processes	Explains the processes involved in treatment and planning clearly, accurately and comprehensively	Gives random, conflicting or confusing information Does not allow patient or relative to ask questions Does not check if patient understands the information
	Discusses relevant issues e.g. cost, logistics	Able to discuss cost and alternative e.g. referral to social welfare Able to arrange for appropriate logistics Addresses patients' concerns and fears	Not empathetic towards patients with difficulties in attending/ complying to treatment
	Documentation	Clear and accurate documentation of discussion Complete documentation in a timely manner	Illegible hand writing Multiple typos in the documentation Incomplete consent form Use of non-standard abbreviation
II	**Deliberation (Deliberation)**		
	Decides on treatment intent, fractionation schedule and urgency	Familiar with dose fractionation for each tumour site Familiar with the dose tolerance of organs at risk Able to work within time constraints (urgent cases)	Selects an inappropriate fractionation Not aware of re-irradiation dose calculation and organ at risk tolerance Does not take into account social/ logistic background
	Selects radiotherapy technique	Selects appropriate radiotherapy technique based on patients' need, benefit and sustainable public healthcare	Applies IMRT/ SBRT technique in advanced metastatic patients with limited lifespan
III	**Pre-treatment patient preparation (Preparation)**		
	Optimises patient's condition for radiotherapy e.g., dentition, nutrition	Recognises needs of pre-simulation care and treatment support Arranges for essential procedures before simulation	Does not refer for dental assessment before radiotherapy simulation / treatment in head and neck cancer patients Does not optimise nutritional status Does not look into other supportive measures e.g., advise smoking cessation, correction of anaemia
	Gives relevant special instructions e.g., full bladder, empty rectum, low residue diet, fasting if requires IV contrast	Foresees special needs of simulation and independently gives instruction to radiographers. Monitors and assists during the simulation process. Recognises special situation e.g., arranging sedation/ GA for paediatric cases.	Gives intravenous contrast without checking history of allergy and time of last meal. Unable to identify loaded rectum. Unaware of full bladder protocol.

	Competencies	Satisfactory	Unsatisfactory
IV	**Simulation**		
	Determines patient positioning and immobilisation devices.	Gives appropriate instruction to radiographers regarding patient positioning. Familiar with different immobilisation devices and their indications.	Does not consider patient's comfort. Advises non-reproducible position.
	Localises the area to be imaged / irradiated including any special instruction e.g., wire scar	Identifies the correct site for imaging. Estimates appropriate bolus thickness and electron energy. Ensures correct image acquisition protocol is used.	Misses important details during simulation e.g., mouth bite, bolus, wiring of scar.
V	**Contouring**		
	Interprets findings from relevant investigations	Uses all appropriate investigation findings (e.g., endoscopic information, intraoperative and histopathologic findings) to assist contouring. Interprets radiology images to assist in contouring	Does not look into patient's previous treatment including previous irradiation Does not refer to diagnostic imaging. Does not refer to important physical findings e.g., vaginal examination, rectal examination etc.
	Delineates target volume	Delineates GTV, CTV and PTV as per international guidelines. Uses appropriate fusion technique. Uses co-registered images for contouring. Completes delineation according to timeline and priority e.g., radical head and neck, cervical cancer cases.	Contours without referring to patient's case/ operative finding/ pathology report/ radiology finding. Contours the wrong targets. Gives inadequate margins.
	Delineates organ at risk (OAR)	Contours important OARs well. Uses correct window level according to OARs. Completes delineation according to timeline.	Does not contour important organ at risk. Contours the wrong OAR. Contours the OAR poorly.
VI	**Dosimetry and plan evaluation**		
	Reviews beam parameters	Determines appropriate beam arrangement Uses appropriate beam modifications e.g., wedges/ shielding/ bolus Chooses correct electron/photon energy	Assigns beam entry/ exit through normal critical organs unnecessarily Chooses wrong field size/ beam energy Shields target
	Evaluates dose distribution and DVH for both targets and OARs	Reviews target coverage Reviews all isodose lines in 3-D Reviews hotspots and dose homogeneity Evaluates dose volume histogram Familiar with organ at risk and planning risk volume tolerances including QUANTEC and Emami and their usage in plan interpretation	Does not review DVHs before approving RT plans Misses hot spots that might have detrimental effects to patients Not aware of OAR constraints in certain groups of patients e.g., paediatric patients, reirradiation Unable to complete planning and approval process according to case priority.
	Prescribes treatment	Prescribes appropriate radiotherapy dose based on ICRU reference – ICRU 50, 63, 83 Prescribes appropriate concurrent chemotherapy Prescribes suitable palliative dose fractionation according to patients' condition and logistics. Prescribes suitable re-irradiation dose fractionation	Does not know prescription point Prescribes wrong dose fractionation

	Competencies	Satisfactory	Unsatisfactory
	Gives relevant special instructions	Identifies needs of special instruction e.g., moving junction Adjusts radiotherapy starting schedule based on foreseen public holidays to avoid gaps Prescribes pre-medication for relevant cases e.g., metoclopramide	Gives confusing instructions to radiographers/ physicists
VII	**Treatment delivery & monitoring**		
	Determines verification protocol	Determines accurate treatment delivery and verification- setup reproducibility, field verification, dose verification, IGRT. Uses the correct tools for verification. Understands and manages systematic and random errors. Familiar with departmental error action trigger level.	Does not review portal images on time Does not take appropriate action on the portal imaging finding Changes isocentre parameters too early e.g., after first fraction
	Verifies treatment set-up	Identifies problems and errors in radiotherapy treatment plans Understands and familiar with radiation quality assurance protocols.	Ignores treatment setup when making decision of correcting errors
	Conducts radiotherapy review	Familiar with toxicity grading criteria e.g., RTOG, CTCAE, LENT-SOMA scale Record and verify- chart checking. Compensates treatment gaps when needed e.g., radical head & neck cases, cervical cancer	Misses weekly full blood count Could not accurately grade toxicity Delays management of treatment toxicity Does not discuss with oncologist in charge before making decision to withhold radiotherapy treatment
VIII	**Additional brachytherapy related skills**		
	Prepares patient for applicator	Reviews blood results in a timely manner Performs physical examination before deciding on suitable applicator Refers patient for anaesthetic assessment	Does not address patient's concerns and worries about the procedure
	Inserts applicator including clean technique, applicator selection, packing, post-procedural care	Practices clean technique Performs procedure systematically e.g., vaginal examination, identifies os, dilates os, sounds the uterus, chooses appropriate applicator size, inserts applicator and packing material. Reviews patient post procedure and treatment for immediate side effects including pain Able to manage immediate serious side effects e.g., bleeding, perforation Ensures patient has been given instructions regarding post procedure care e.g., vaginal dilatation	Poor applicator alignment Rough handling of patients which may lead to perforation/pain Clumsy Does not call for help when required. Poor packing Panicked during complication/ side effects management

Appendix 11: Assessment IBA – Systemic Therapy

Form 11-1: Intervention-Based Assessment – Systemic Therapy (IBA-ST)

Rating: S=Satisfactory U=Unsatisfactory N=Not observed

☐ Cytotoxic	☐ Targeted	Tumour Site: _____
☐ Hormonal	☐ Supportive	Regimen/Agent Name: _____

	Competencies and definitions	S/U/N	Comments
I	**Consent**		
	Has thorough knowledge of indications and aims of treatment		
	Explains the benefits and side effects		
	Explains treatment processes		
	Discusses relevant issues e.g., cost, logistics		
II	**Deliberation**		
	Decides on treatment intent and urgency		
	Selects treatment regimens and schedule including infusion methods and duration		
III	**Pre-treatment patient preparation**		
	Optimises patient's condition for systemic therapy e.g., nutrition, blood count		
	Organises relevant baseline investigations		
IV	**Prescription**		
	Prescribes pre-medication and hydration		
	Prescribes / calculates dose using relevant formulas e.g., BSA, AUC, GFR and modify dose appropriately		
V	**Treatment response assessment**		
	Selects methods to assess tumour response (clinical, radiological, biochemical)		
	Determines response using established criteria e.g. RECIST		
VI	**Side effects management**		
	Assesses and grades side effects		
	Manages side effects e.g., prescribe appropriate supportive medication, prophylactic treatment, modify infusion rate		
	Arranges relevant treatment monitoring investigations e.g., periodic echocardiogram during trastuzumab therapy		

Form 11-1 IBA-ST (continued)

Global Summary			
Level at which completed elements of IBA were performed		**Tick as Appropriate**	**Comments**
1	Insufficient evidence observed to support a judgement		
2	Requires full supervision to perform the intervention		
3	Able to perform the intervention with some supervision		
4	Able to perform the intervention with minimal supervision (will need occasional help)		
5	Competent to perform the intervention unsupervised (can manage complications)		

Additional Comment/ Suggestion	
Additional Assessor's comments	
Trainee's comments	
Trainee's signature	**Assessor's name & signature**

Form 11-2: IBA-ST Validation

	Competencies	Satisfactory	Unsatisfactory
I	**Consent**		
	Demonstrates sound knowledge of indications and aims of treatment	Discusses treatment aims and rationale	Gives unrealistic expectation on outcome
	Explains the benefits and side effects	Explains expected benefits e.g., improvement in symptoms, response, survival Discusses potential side effects and measures to mitigate e.g., fertility-sparing options / contraception Counsels patient on actions to be taken when side effects occur	Does not explain the side effects Does not inform about risk of infertility in young patients Uses medical jargon
	Explains treatment processes	Speaks clearly using layman's terms Shows good eye contact Answers patient's questions	Rushes the patients Gives wrong explanation Does not check patient's understanding
	Discusses relevant issues e.g., cost, logistics	Advises patient on cost differences between options with similar benefit	Does not consider where patient lives when choosing treatment scheduling
II	**Deliberation**		
	Decides on treatment intent and urgency	Correctly decides on treatment intent Arranges for urgent treatment as indicated	Overlooks patient's general condition in determining treatment intent
	Selects treatment regimens and schedule including infusion methods and duration	Selects reasonable treatment regimen Chooses the optimum schedule Considers patient's needs and preference in treatment decision	Plans for unsuitable regimens in high risk patients e.g., combination chemotherapy in elderly frail patient, organ dysfunction Does not take previous treatment details into consideration
III	**Pre-treatment patient preparation**		
	Optimises patient's condition for systemic therapy e.g., nutrition, blood count	Takes adequate past medical history to ascertain co-morbidities Refer patient with poor nutritional status to a dietician	Does not counsel for venous access device in patients with poor peripheral venous access
	Organises and interprets baseline investigations	Organises relevant baseline investigations in a timely manner e.g., confirms post-menopausal status prior to initiating aromatase inhibitors	Does not review baseline investigation results Does not check patient's pregnancy status
IV	**Prescription**		
	Prescribes pre-medication and hydration	Gives detailed instructions on hydration e.g., for platinum drugs Prescribes adequate antiemetic based on emetogenic potential	Does not prescribe oral care for drugs with high risk of stomatitis e.g., everolimus Does not prescribe allopurinol in high burden germ cell tumours
	Prescribes/ calculates dose using relevant formulas e.g., BSA, AUC, GFR and modify dose accordingly	Calculates chemotherapy doses correctly	Prescribes wrong drug Prescribes wrong dosing schedule

	Competencies	Satisfactory	Unsatisfactory
V	**Treatment response assessment**		
	Selects methods to assess tumour response (clinical, radiological, biochemical)	Selects suitable tools for response assessment	Does not examine patients to assess response Does not arrange for response assessment investigations e.g. tumour markers
	Determines response using established criteria e.g. pain score, RECIST	Evaluates patient's symptoms to assess clinical response Reviews the imaging done properly to assess radiographic response Concludes treatment response correctly	Does not assess response to treatment Does not review images but concludes on response based on reports alone
VI	**Side effects management**		
	Assesses and grades side effects	Asks relevant questions to assess severity e.g., frequency of bowel movement for diarrhoea	Does not ask for important side effects Grades severity wrongly
	Manages side effects	Prescribes pre-medication according to side effect profiles e.g., anti-emetics for emetogenic agents, high dose dexamethasone for taxanes Prescribes supportive treatment for emergent side effects e.g., laxative for constipation	Does not modify or with-hold treatment when required e.g., significant treatment-related neutropenia
	Arranges treatment monitoring investigations	Arranges baseline / interval cardiac assessment e.g., echocardiogram for patients on cardiotoxic drugs e.g., doxorubicin, trastuzumab	Does not act on monitoring results e.g., continue treatment in patients with grade three liver impairment

Appendix 12: Assessment – Other Forms

Form 12-1: Clinical Attachment Appraisal

Trainee's name:	**Supervisor's name:**
Matrix no.	**Hospital:**
Year of Training:	**Dates from: to:**

CRITERIA	SCALE*	COMMENTS
KNOWLEDGE		
Basic Sciences		
General Oncology		
CLINICAL SKILLS		
General clinical skills		
Management of tumour by site		
Management of oncological emergencies		
Management of systemic therapy		
Management of palliative care		
COMMUNICATION SKILLS		
Patients/families (breaking bad news; informed consent)		
Medical colleagues		
Support staff		
EXTRACURRICULAR/NON-CLINICAL ACTIVITIES (e.g., oral/poster presentations, research /publication (not research project), external courses/seminars/meetings, invited speaker etc.) To be listed by trainees (if any):		
SUPERVISOR'S OVERALL COMMENTS:		

Supervisor's signature:		Date:	
Trainee's signature:		Date:	
Course Coordinator's signature:		Date:	

***Scoring scale: 1= Poor; 2= Fair; 3= Satisfactory; 4= Good; 5= Excellent.**

Form 12-2: Research Progress Report

Trainee's Name	
National Training Number	
Year of Enrolment	
Current Academic Year	
Date of Review	

Items		**Yes**	**No**	**Comments**
1.	Has a research project been determined?			
2.	The research proposal has been accepted by the hospital ethics committee?			Date of approval:
3.	Title of research project.			
4.	Specify the source of funding for the research, if any and the amount (in RM).			
5.	Has the research project started? Has the first subject has been recruited? Has data collection started?			Date of starting:
6.	Is recruitment / data collection completed?			
7.	Is data analysis completed?			
8.	Has the research report been submitted for evaluation?			Date of Submission:
9.	Participation / submission i. Oral presentation ii. Poster presentation iii. Publication iv. Dissertation			Date of presentation / acceptance of publication:
10.	Result of evaluation of research report (if any).			

Comments by Trainee			
Trainee's Signature		**Date**	
Comments by Research Supervisor			
Signature & Name of Research Supervisor		**Date**	

Form 12-3: Annual Review Report

Trainee's Name	
National Training Number	
Year of Enrolment	
Current Academic Year	
Training Centre	
Trainers within 12 Months	
Date of Review	
Review Summary and Recommendations:	
Trainee's Signature, Date:	
Panel of Reviewers:	

Reviewer	Name	Signature	Date
1			
2			
3			

Annual Review - Clinical Oncology Training Portfolio

Clinical Oncology Training Portfolio (COTPort)	Satisfactory / Fulfilled	Unsatisfactory / Not fulfilled	Remarks
Part A: Logbooks			
Radiotherapy			
Systemic therapy			
Part B: Clinical Attachment Assessment			
Case Based Discussion (CBD) - General skills			
Intervention Based Assessment (IBA) - Radiotherapy (IBA-RT)			
Intervention Based Assessment (IBA) - Systemic Therapy (IBA-ST)			
Clinical Attachment Appraisal			
Part C: Research Project			
Research Progress Report			
Oral Presentation			
Poster Presentation			
Publications (*including proceeding)*			
Part D: Courses			
Good Clinical Practice			
Research Methodology			
Scientific Writing			
Statistical Analysis			
Communication Skills			
Medical Ethics			
Palliative Care			
FRCR Examination Preparatory Courses			
Part E: Professional Behaviour			
Work Attendance			
Formal Teaching Session Attendance			
Discipline			
Others (feedback, reflective practice)			
Part F: Examinations			
Part One MCO / First FRCR			
Part Two MCO / Final FRCR			
Final			

GLOSSARY

Term	Description
AMM	Academy of Medicine Malaysia
BPL	'Bahagian Pengurusan Latihan'
BPP	'Bahagian Perkembangan Perubatan'
CAA	Clinical Attachment Appraisal
CBD	Case-Based Discussion
CME	Continuous Medical Education
COSCO	Clinical Oncology Specialty Committee
COTPort	Clinical Oncology Training Portfolio
COQ	Case-Orientated Questions
CSC	Clinical Short Cases
ELA	Essential Learning Activities
FRCR	Fellowship of Royal College of Radiologists
JLKPP	'Jawatankuasa Latihan Kepakaran' Parallel Pathway
IBA	Intervention-Based Assessment
IELTS	International English Language Testing System
MCO	Masters of Clinical Oncology
MCQ	Multiple Choice Questions
MEC	Malaysian Education Committee
MedEx	Medical Specialist Pre-Entrance Examination
MMC	Malaysian Medical Council
MOH	Ministry of Health
MOHE	Ministry of Higher Education
MOS	Malaysian Oncological Society
MQA	Malaysian Qualifications Agency
MQF	Malaysian Qualifications Framework
MUET	Malaysian University English Test
NCCOM	National Postgraduate Curriculum for Clinical Oncology Malaysia
NPMC	National Postgraduate Medical Curriculum
NSR	National Specialist Registry
OSCE	Objective Structured Clinical Examination
SAQ	Short Answer Questions
TOEFL	Test of English as a Foreign Language
UK	United Kingdom
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
USM	Universiti Sains Malaysia
WBA	Workplace-Based Assessment

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