



# **A Syllabus for the Education and Training of RTTs**

**(radiation therapists/  
therapy radiographers)**

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## FOREWORD

The number of cancer patients is rapidly increasing in the developing countries. Radiotherapy is a crucial component of the modern treatment of cancer but is, unfortunately, not available to the majority of the patients in developing countries.

The International Atomic Energy Agency has been assisting Member States in the establishment, operation and upgrading of radiation oncology facilities. The assistance, in addition to the training of medical doctors and medical physicists in radiation oncology, also includes the training of professionals (known in various countries as radiation therapists, therapy radiographers, manipulators, radiation therapy technologists, etc.) that are responsible for the actual operation of radiotherapy machines for the treatment of patients. The shortage of such well-trained professionals is a serious obstacle to making radiotherapy accessible to cancer patients.

For better communication the AFRA-RCA (AFRA: African Regional Agreement for Research, Development and Training Related to Nuclear Science and Technology, RCA: Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology (Asia & Pacific)) task force recommended the abbreviation 'RTT' to describe these professionals instead of the different terms used in different countries.

IAEA funded training often involved sending RTTs to foreign countries at great expense and risk of 'brain drain'. The development of RTT training in many countries in Africa and Asia is in its infancy, but national/sub-regional training programs for RTTs will be essential for meeting current and future needs for well-trained RTTs. AFRA and RCA project coordinators decided to address this challenge by establishing a harmonized minimum acceptable syllabus for the education and training of RTTs.

A task force including representatives from both regions as well as international experts was created and drafted this report in 2002 in Mauritius. It was then field-tested in a 'training the trainers' AFRA workshop in Morocco in 2003, and subsequently approved by the AFRA and RCA project coordinators.

This training guidebook is addressed to all professionals and administrators involved in the training of RTTs, in order to establish a common and consistent framework. Model assessment forms are also included that can be adapted or customized according to local requirements.

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### *EDITORIAL NOTE*

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## 1. GENERAL CONSIDERATIONS

### 1.1. Roles of the RTT

The identification of the roles expected of an RTT preceded the production of a detailed syllabus. In broad terms these roles are:

#### **Treatment preparation**

- Awareness of diagnostic modalities relevant to oncology
- Planning/Dosimetry
  - Localization/Simulation
  - Hand and computer planning
    - Single field (skin, metastases)
    - Parallel opposed (palliative and radical intent)
- Mould room practice
- Treatment calculations
- Quality control and Quality Assurance

#### **Treatment equipment**

Knowledge of the characteristics of the equipment and the appropriate selection of equipment for common malignancies.

- Superficial
- Orthovoltage
- Cobalt-60
- Linear accelerator
- Brachytherapy (LDR and HDR)

#### **Treatment set-up and delivery**

- Single field (skin, metastases)
- Parallel opposed (palliative and radical intent)
- Multiple planned fields
  - Simple 2 field plan
  - Box (Ca Cx)
  - 3-field with wedge (Bladder)
  - Complex planned treatment
  - 3-D
  - Mixed modality (head and neck, breast)

- Detecting abnormal equipment displays that may indicate a malfunction.
- Intervening in case of an accident or emergency.

### **Patient care**

- Before
  - Awareness of patient management before attending for radiation oncology
- During
  - Treatment preparation
  - Monitoring the patient during treatment
  - Detecting and communicating to the physician any unusual patient reactions
- After
  - Awareness of patient management after completion of treatment (follow-up)

### **In summary**

The RTT will need:

- Ability and skills to work in a team
- Technological aptitude
- Academic knowledge
- Technical skills, knowledge and ability
- Knowledge of radiation protection
- Professionalism
- Communication skills
- Computer skills
- Problem solving ability
- Continued professional development (CPD)

### **1.2. Duration of training**

The task force recommends that the duration of training of an RTT be no less than 2 years. Of this, one year must be in a clinical environment. The clinical training should begin as early as possible, concurrently with classroom education. The minimum training period for an RTT may be supplemented, depending upon local conditions and regulations, by a period of internship or on-the job training. This also, of course, applies whenever a new technology is introduced into the department.

Individuals already trained and working as diagnostic radiographers, may be suitable for a shortened period of training as detailed later (Section 2.2), but not less than 15 months. Of this, at least 9 months should be in a clinical environment.

Individuals who will only work in the mould room, for the fabrication of immobilization and shielding devices, but otherwise have no responsibility for the treatment of patients may require significantly less education and training according to local circumstances and regulations. On the other hand, individuals expected to work as dosimetrists/physics assistants must receive additional appropriate training, details of which are beyond the scope of this document.

### **1.3. Staffing levels**

RTT staff allocation is critical to the accurate treatment of patients and to the success of the proposals for training centers and promotion of CPD. The external beam units in Africa and Asia are often within an environment where it is advantageous to utilize the equipment for extended hours and shifts are therefore likely. The recommended working hours are 6–8 hours per day per therapist.

Each megavoltage unit should be staffed at a minimum by two therapists at all times, and the staffing allocation should therefore take this into account. It is recommended that the minimum RTT allocation is as follows: 2 RTTs per shift per unit, 1 chief therapist per unit, plus 1 additional therapist to ensure uninterrupted service on account of sickness, vacation, etc. For example there would be 1 chief plus 7 RTTs on a unit that runs for 3 shifts per day. Similar considerations apply to the staffing of a simulator, viz. 2 therapists per shift. For staffing the mould room, at least one person per shift is recommended.

In addition to the above, where medical physics support is limited, and RTTs are expected to function as dosimetrists/physics assistants, a minimum of one properly trained dosimetrist/physics assistant per shift is recommended, working under the supervision of a qualified clinical physicist.

## **2. SYLLABI**

### **2.1. Direct entry syllabus**

This syllabus outlines the essential topics which must be included in a curriculum for the education of radiation therapists (RTTs) with no prior radiographer training.

The three equipment levels take into account the reality in many developing countries that many RTTs work in departments with only a limited range of equipment available. The equipment level one topics reflect the necessary content for a graduate who will work in a department with Cobalt-60 and/or a single energy linac as the main modality. The task force members felt that even at that basic equipment level all RTTs should be trained in technology relating to mould room, simulation, brachytherapy and simple treatment planning. Equipment level two is designed for departments with multi-energy linear accelerators and more complex treatment planning capabilities, while equipment level three is for departments involved with modern imaging-based treatment planning for IMRT and other special procedures. Details of the level descriptors are given below.

### **LEVEL DESCRIPTORS**

#### **LEVEL 1**

This is considered to be the basic level at which a graduate will have gained sufficient theoretical knowledge to understand the scientific concepts underpinning radiotherapy and have spent sufficient time in a clinical setting to achieve the level of clinical competence to work accurately and safely.

The level 1 programme will be of two years duration and will be divided equally between the academic and clinical components. The programme has been designed primarily to cater for graduates who will subsequently work in a radiotherapy department where the main modality used for treatment is a Cobalt-60 unit and/or a single energy linac with simulator and mould room support. It is anticipated that Brachytherapy will be in most departments and must therefore be included at this level.

The focus of the academic content is to give a basic understanding of:

- The structure and function of the body
- Cross sectional, surface and radiological anatomy as it relates to radiotherapy
- Radiation and Equipment physics
- Basic radiobiology / molecular oncology
- Professional role
- Basic patient care
- Site specific oncology and epidemiology
- The practice of radiotherapy to include diagnosis, general management, simulation, planning, treatment, patient care and quality assurance.

Details of the syllabus content are given on the following pages. The emphasis is on delivery of treatment through simple techniques and where personnel with additional training carry out the more complex tasks. The responsibility assumed by the graduates of the level 1 course would relate directly to treatment delivery.

## **LEVEL 2**

The content of the level 2 course includes all of the above but is extended to include:

- Linear accelerator (multi-energy)
- Radionuclide therapy
- More complex radiobiology
- Information technology.

The level 2 programme will be of a longer duration depending on the centre requirements and the level of additional responsibility which is expected of the graduate. Additional emphasis may be placed on the academic content. A deeper level of knowledge and understanding will be facilitated with the aim of moving towards development of a reflective practitioner. The programme has been designed primarily to cater for graduates who will subsequently work in a radiotherapy department where the main modality used for treatment are multi-energy Linear Accelerators and Brachytherapy with simulator and mould room support. The graduate will be expected to become involved in specified quality assurance procedures and information technology.

Details of the syllabus content are given on the following pages. The emphasis is on delivery of treatment through more complex tasks. The responsibility assumed by the graduates of the level 2 course would relate to treatment preparation and delivery, development of quality assurance procedures and protocols, data input and supervision.

## **LEVEL 3**

The content of the level 3 course includes all of the content of level 2 but is further extended to include:

- Physics of CT simulator and CT scanner
- Heavy particle accelerators
- Special techniques.

The level 3 programme will be of three to four years duration depending on the centre requirements and the level of additional responsibility which is expected of the graduate. Additional emphasis may be placed on the academic content. A deeper level of knowledge and understanding will be facilitated moving towards a reflective practitioner. Some research skills should be incorporated. The programme has been designed primarily to cater for graduates who will subsequently work in a radiotherapy department where the main modality used for treatment are Linear Accelerators, Heavy particle accelerators and Brachytherapy with simulator and mould room support. Graduates will be expected to become involved in specified quality assurance procedures, treatment planning, some management and information technology.

Details of the syllabus content are given on the following pages. The emphasis is on delivery of treatment through special techniques and more complex tasks and the support and encouragement of more junior staff. The responsibility assumed by the graduates of the level 3 course would relate to treatment preparation and delivery, development of quality assurance procedures and protocols, treatment planning, data input and management.

Individual topics can, of course, be covered to varying depths depending on the requirements of the individual centres and additional topics (e.g. intraoperative radiotherapy) can be added as appropriate.

Teaching, learning and assessment methods will be decided upon by the training centre and will depend on the available resource and expertise. Regular assessments are a crucial part of the syllabus and some helpful tools for this purpose are provided.

SUBJECT	LEVEL		
	1	2	3
<b>ANATOMY, PHYSIOLOGY AND PATHOLOGY</b>			
<b>Cell</b>			
Structure	X		
Function	X		
Cell cycle	X		
Cell cycle control	X		
<b>Tissue</b>			
Structure	X		
Tissue types – features and function	X		
<b>Organs and systems</b>			
Skin	X		
Bone and muscle	X		
Nervous	X		
Endocrine	X		
Lymphatic system	X		
Cardiovascular	X		
Respiratory	X		
Digestive (Gastro-intestinal)	X		
Urinary	X		
Reproductive	X		
Structure, function and common diseases encountered in the region should be covered for each system.			
<b>Surface anatomy</b>	X		
<b>Cross sectional anatomy</b>	X		
<b>Radiographic Anatomy</b> (including cross sectional images). Students should be taught how to identify the different organs/structures on plain x rays, CT scans and other available imaging modalities.	X		
<b>PHYSICS</b>			
<b>Structure of matter</b>	X		
<b>Atomic structure</b>	X		
Electrons	X		
Neutrons	X		
Protons	X		
Importance in radiotherapy			
<b>Radioactivity</b>	X		
<b>Interaction of radiation and matter</b>	X		
Photoelectric	X		
Compton	X		
Pair Production	X		
Importance in radiotherapy			
<b>Nature and production of ionising radiation</b>	X		
<b>Measurements and units</b>	X		

SUBJECT	LEVEL		
	1	2	3
<b>Beam characteristics</b>			
Photon	X		
Electron	X		
Heavy particle	X		
<b>Basic mathematics related to radiotherapy</b>	X		
<b>Radiation protection</b>			
Staff	X		
Patients	X		
Visitors	X		
General public	X		
<b>RADIOTHERAPY EQUIPMENT</b>			
<b>Simulator</b>	X		
<b>CT Scanner</b>		X	
<b>CT Simulator</b>			X
<b>Treatment units</b>			
Superficial	X		
Orthovoltage	X		
Cobalt	X		
Linear Accelerator (photons only)	X		
Linear Accelerator (photons and electrons)		X	
Linear Accelerator (IMRT and specialized treatments)			X
<b>Physical characteristics</b>	X		
<b>Optical systems</b>	X		
<b>Couches</b>	X		
<b>Laser systems</b>	X		
<b>RADIOBIOLOGY / MOLECULAR ONCOLOGY</b>			
Radiation effect at cellular level	X		
Radiation effect on human tissue	X		
Radiation effect on organs	X		
Radiation effect on the foetus	X		
Radiation effect on malignant cells and tissues	X		
Fractionation and its effect	X		
Biological modifiers (to include chemotherapy agents commonly used)	X		
LET		X	
RBE		X	
Radiobiological models		X	
<b>PROFESSIONAL ASPECTS</b>			
Principles of professional practice	X		
Universal precautions	X		
Appearance	X		
Hygiene	X		
History and role of radiotherapy in cancer	X		
Medical terminology	X		

SUBJECT	LEVEL		
	1	2	3
<b>Information technology</b>			
Computer skills	X		
Internet access	X		
Resourcing information	X		
Reading medical journal/article	X		
Critique of articles	X		
Referencing	X		
Scientific writing		X	
Research		X	
The multidisciplinary approach to cancer diagnosis and management and how the patient arrives in radiotherapy	X		
<b>Care of the patient</b>			
General care of the patient	X		
Lifting and moving techniques for patient and staff safety	X		
Basic nursing procedures for patient care and emergency situations	X		
First Aid to include Cardio Pulmonary Resuscitation	X		
<b>Procedure in a radiotherapy department (theoretical)</b>	X		
First visit			
Treatment review			
Importance of follow-up			
} To include room preparation, equipment and documentation necessary and assistance with procedures or examinations. Instructions to patients.			
<b>Care of the cancer patient</b>			
Patient privacy	X		
Nutrition	X		
Skin care	X		
Universal precautions	X		
Dietary advice	X		
Laboratory investigations	X		
Care under specific circumstances	X		
Catheter care	X		
Stoma care	X		
Wound care	X		
Unconscious patient	X		
Bone metastases	X		
Physically disabled	X		
Mentally disturbed	X		
Blind, deaf patients	X		
Diabetics	X		
Communication skills	X		
Verbal	X		
Non-verbal	X		
Information giving	X		
Ethical and cultural issues	X		
Gender	X		

SUBJECT	LEVEL		
	1	2	3
Culture	X		
Religion	X		
Age	X		
Children } To include impact on other family members	X		
Young adults }	X		
Adults }	X		
Elderly }	X		
<b>Legal aspects</b>			
Confidentiality	X		
Informed consent	X		
Data protection – storage lengths, etc.	X		
Health and safety	X		
Radiation	X		
<b>ONCOLOGY AND EPIDEMIOLOGY</b>			
For each identified site the aetiology and epidemiology, signs and symptoms, diagnosis and general management must be covered	X		
Breast	X		
Gynaecological	X		
Gastro-intestinal tract	X		
Liver	X		
Head and neck	X		
Prostate	X		
Lung	X		
Lymphomas	X		
Bladder	X		
CNS	X		
Kaposi sarcoma	X		
Others as considered appropriate to the country	X		
<b>Cancer prevention and public education</b>	X		
<b>Promoting a healthy lifestyle</b>	X		
<b>Early detection</b>	X		
<b>Screening</b>	X		
<b>Benign and malignant disease</b>	X		
<b>Methods of spread of malignant disease</b>	X		
<b>Staging and grading systems</b>	X		
<b>Introduction to genetics, genetic predisposition and high risk groups</b>	X		
<b>Treatment modalities for common malignancies</b>			
Radiation therapy } To include indications for use, and application – alone or in combination with other modalities	X		
Surgery }	X		
Chemotherapy }	X		
Immunotherapy }	X		
Hormonal therapy }	X		
Radio nuclide therapies }	X		

SUBJECT	LEVEL		
	1	2	3
<b>THE RADIOTHERAPY PROCESS</b>			
<b>Treatment intent</b>	X		
Curative	X		
Palliative	X		
<b>Treatment modalities</b>	X		
Teletherapy	X		
Superficial	X		
Orthovoltage	X		
Cobalt	X		
Linear Accelerator (Photons)	X		
Linear Accelerator (X and e)		X	
Heavy Particle			X
<b>Brachytherapy</b>			
(The principles of pre-loaded or after-loaded)	X		
Interstitial or intracavitary	X		
HDR	X		
LDR	X		
PDR	X		
Radio nuclides commonly used	X		
<b>Radio nuclide therapy (unsealed sources)</b>		X	
<b>Site specific</b>	X		
For each identified site the aetiology and epidemiology, signs and symptoms, diagnosis and general patient management must be covered			
Breast	X		
Gynaecological	X		
Gastro-intestinal tract	X		
Liver	X		
Head and neck	X		
Prostate	X		
Lung	X		
Lymphomas	X		
Bladder	X		
CNS	X		
Kaposi sarcoma	X		
Others as considered appropriate to the country	X		
<b>Immobilization procedures</b>			
General principles	X		
Mould room	X		
Materials used	X		
Procedures followed	X		
Safety issues	X		

SUBJECT	LEVEL		
	1	2	3
<b>Simulation/Treatment preparation</b>			
Patient positioning, immobilization and reproducibility	X		
Localisation and simulation	X		
Definition of target volumes and organs at risk	X		
Contours	X		
Documentation	X		
Lasers / Markings	X		
Verification	X		
Film processing	X		
<b>Mould room activities</b>			
Shielding	X		
Materials used for shielding	X		
Individual shielding	X		
Management of pollution and hazards	X		
<b>Planning and dose calculation</b>			
Target volume	X		
Organs at risk	X		
ICRU	X		
Dimensions	X		
Percentage Depth Dose, Tissue Air Ratio, OAR, TMR, TPR	X		
Isodose charts	X		
Influence of shielding and FSD on the dose distribution	X		
2D	X		
3D	X		
Beam attenuation and compensation	X		
Conformal therapy	X		
Basic calculations	X		
Tumour dose	X		
Mean, maximum, minimum	X		
Number of fractions	X		
Treatment time	X		
Monitor units	X		
Beam attenuators	X		
Normal tissue tolerance	X		
Patients treatment chart	X		
<b>Treatment delivery</b>			
Radiotherapy specific technique must be included for each common Sites to include:	X		
Breast	X		
Gynaecological	X		
Gastro-intestinal tract	X		
Head and neck	X		
Prostate	X		
Lung	X		

SUBJECT	LEVEL		
	1	2	3
Lymphomas	X		
Bladder	X		
CNS	X		
Kaposi sarcoma	X		
Others as considered appropriate to the country	X		
<b>Common treatment delivery techniques</b>			
Single field	X		
Parallel opposed	X		
Multiple fields	X		
<b>Patient positioning, immobilization and reproducibility</b>			
Set-up procedures	X		
Manual	X		
Computer assisted	X		
Data verification, registration or recording	X		
Dose monitoring	X		
Verification	X		
Documentation	X		
<b>Patient management on treatment</b>			
Side effect related to radiation and dose	X		
Acute	X		
Late	X		
Monitoring of side effects	X		
Management of side effects	X		
Information and communication	X		
Documentation of side effects	X		
<b>Special techniques</b>			
Paediatrics	X		
Total Body Irradiation			X
Stereotactic			X
Total Skin Irradiation			X
Intensity Modulated Radiotherapy (e.g. Intraoperative radiotherapy)			X
Other as appropriate			X
<b>Quality assurance/control</b>			
Equipment	X		
Procedures (Evidence based)		X	
Protocols (Evidence based)		X	
Audit		X	
Incident registration		X	

SUBJECT	LEVEL		
	1	2	3
<b>Health and safety</b>			
Universal precautions	X		
Occupational injury	X		
Infection control	X		
Fire, etc.	X		

## 2.2. Syllabus for diagnostic radiographers

This syllabus outlines the essential additional topics which must be included in any curriculum developed for the education of diagnostic radiographers to enable them to qualify and practice as radiation therapists (RTTs).

The three equipment levels take into account the reality in many developing countries that many RTTs work in departments with only a limited range of equipment available. The equipment level one topics reflect the necessary content for a graduate who will work in a department with Cobalt-60 and/or a single energy linac as its main modality. The task force members felt that even at that basic equipment level all RTT should be trained in technology relating to mould room, simulation, brachytherapy and simple treatment planning. Equipment level two is designed for departments with multi-energy linear accelerators and more complex treatment planning capabilities, while equipment level three is for departments involved with modern imaging-based treatment planning for IMRT and other special procedures.

Individual topics can, of course, be covered to varying depths depending on the requirements of the individual centres and additional topics can be added as appropriate.

Teaching, learning and assessment methods will be decided upon by the training centre and will depend on their level of available resource and expertise. Regular assessments are a crucial part of the syllabus and some helpful tools for this purpose are provided.

SUBJECT	LEVEL		
	1	2	3
<b>RADIOTHERAPY EQUIPMENT</b>			
<b>Atomic structure</b>	X		
Electron } Importance in radiotherapy	X		
Neutron }	X		
Proton }	X		
<b>Radioactivity</b>	X		
<b>Interaction of radiation and matter</b>	X		
Photoelectric } Importance in radiotherapy	X		
Compton }	X		
Pair production }	X		
<b>Measurements and units</b>	X		
<b>Beam characteristics of</b>			
Photon	X		
Electron	X		
Heavy particle	X		
<b>Basic mathematics related to radiotherapy</b>	X		
<b>Simulator</b>	X		
<b>CT Simulator</b>		X	
<b>Treatment units</b>			
Superficial	X		
Orthovoltage	X		
Cobalt	X		
Linear accelerator (photons only)	X		
Linear accelerator (photons and electrons)		X	
Linear accelerator (IMRT and specialized treatments)			X

SUBJECT	LEVEL		
	1	2	3
<b>Physical characteristics</b>	X		
<b>Optical systems</b>	X		
<b>Couches</b>	X		
<b>Laser systems</b>	X		
<b>RADIOBIOLOGY / MOLECULAR ONCOLOGY</b>			
At cellular level	X		
On human tissue	X		
On organs	X		
The foetus	X		
On malignant cells and tissues	X		
Fractionation and its effect	X		
Biological modifiers to include chemotherapy agents commonly used	X		
LET		X	
RBE		X	
Radiobiological models		X	
<b>ONCOLOGY AND EPIDEMIOLOGY</b>			
<b>Cell</b>	X		
Cycle	X		
Cycle control	X		
<b>Lymphatic system</b>	X		
<b>Site specific</b>	X		
For each identified site the aetiology and epidemiology, signs and symptoms, diagnosis and general management must be covered			
Breast	X		
Gynaecological	X		
Gastro-intestinal tract	X		
Liver	X		
Head and neck	X		
Prostate	X		
Lung	X		
Lymphomas	X		
Bladder	X		
CNS	X		
Kaposi sarcoma	X		
Others as considered appropriate to the country	X		
<b>Cancer prevention and public education</b>	X		
<b>Promoting a healthy lifestyle</b>	X		
<b>Early detection</b>	X		
<b>Screening</b>	X		
<b>Benign and malignant disease</b>	X		
<b>Methods of spread of malignant disease</b>	X		
<b>Staging and grading systems</b>	X		
<b>Introduction to genetics, genetic predisposition and high risk groups</b>	X		

SUBJECT	LEVEL		
	1	2	3
<b>Treatment modalities for common malignancies</b>			
Radiation therapy	X		
Surgery	X		
Chemotherapy	X		
Immunotherapy	X		
Hormonal therapy	X		
Radio nuclide therapies	X		
<b>THE RADIOTHERAPY PROCESS</b>			
<b>History and role of radiotherapy in cancer</b>	X		
<b>Medical terminology</b>	X		
<b>Information technology</b>			
Computer skills	X		
Internet access	X		
Resourcing information	X		
Reading medical journal/article	X		
Critique of articles	X		
Scientific writing	X		
Scientific writing		X	
Research		X	
The multidisciplinary approach to cancer diagnosis and management and how the patient arrives in radiotherapy	X		
<b>General care of the cancer patient</b>	X		
<b>Procedure in a radiotherapy department (theoretical)</b>	X		
First visit	X		
Treatment review			
Importance of follow-up			
<b>Care of the cancer patient</b>	X		
Patient privacy	X		
Nutrition	X		
Skin care	X		
Universal precautions	X		
Dietary advice	X		
Laboratory investigations	X		
Care under specific circumstances	X		
Catheter care	X		
Stoma care	X		
Wound care	X		
Unconscious patient	X		
Bone metastases	X		
Physically disabled	X		
Mentally disturbed	X		
Blind, deaf patients	X		
Diabetics	X		

SUBJECT	LEVEL		
	1	2	3
Communication skills	X		
Information giving	X		
Age	X		
Children } To include impact on other family members	X		
Young adults }	X		
Adults	X		
Elderly	X		
<b>Treatment intent</b>	X		
Curative	X		
Palliative	X		
<b>Treatment modalities</b>	X		
Teletherapy	X		
Superficial	X		
Orthovoltage	X		
Cobalt	X		
Linear Accelerator (Photons)		X	
Linear Accelerator (X and e)			
Heavy Particle			X
<b>Brachytherapy</b>	X		
(The principles of pre-loaded or after loaded)	X		
Interstitial or intracavitary	X		
HDR	X		
LDR	X		
PDR	X		
Radio nuclides commonly used	X		
<b>Radio nuclide therapy (unsealed sources)</b>		X	
<b>Site specific</b>	X		
For each identified site the aetiology and epidemiology, signs and symptoms, diagnosis and general management must be covered			
Breast	X		
Gynaecological	X		
Gastro-intestinal tract	X		
Liver	X		
Head and neck	X		
Prostate	X		
Lung	X		
Lymphomas	X		
Bladder	X		
CNS	X		
Kaposi sarcoma	X		
Others as considered appropriate to the country	X		

SUBJECT	LEVEL		
	1	2	3
<b>Immobilization procedures</b>			
Mould room	X		
Materials used	X		
Procedures followed	X		
Safety issues	X		
<b>Simulation/Treatment Preparation</b>			
Patient positioning, immobilization and reproducibility	X		
Localisation and simulation	X		
Definition of target volumes and organs at risk	X		
Contours	X		
Lasers/Markings	X		
Documentation of all of the above in patient's chart	X		
Verification	X		
Film processing	X		
<b>Mould room activities</b>	X		
Shielding	X		
Materials used for shielding	X		
Individual shielding	X		
Management of pollution and hazards	X		
<b>Planning and Dose Calculation</b>			
Target volume	X		
Organs at risk	X		
ICRU	X		
Dimensions	X		
Percentage Depth Dose, Tissue Air Ratio, OAR, TMR, TPR	X		
Isodose charts	X		
Influence of shielding and FSD on the dose distribution	X		
2D	X		
3D	X		
Beam attenuation and compensation	X		
Conformal therapy	X		
Basic calculations	X		
Tumour dose	X		
Mean, maximum, minimum	X		
Number of fractions	X		
Treatment time	X		
Monitor units	X		
Beam attenuators	X		
Normal tissue tolerance	X		
Patients treatment chart	X		

SUBJECT	LEVEL		
	1	2	3
<b>Treatment delivery</b>			
Radiotherapy specific technique must be included for each common Sites to include:	X		
Breast	X		
Gynaecological	X		
Gastro-intestinal tract	X		
Head and neck	X		
Prostate	X		
Lung	X		
Lymphomas	X		
Bladder	X		
CNS	X		
Kaposi sarcoma	X		
Others as considered appropriate to the country	X		
<b>Common treatment delivery techniques</b>			
Single field	X		
Parallel opposed	X		
Multiple fields	X		
<b>Patient positioning, immobilization and reproducibility</b>			
Set-up procedures	X		
Manual	X		
Computer assisted	X		
Data verification, registration or recording	X		
Dose monitoring	X		
Verification	X		
Documentation	X		
<b>Patient management on treatment</b>			
Side effect related to radiation and dose	X		
Acute	X		
Late	X		
Monitoring of side effects	X		
Management of side effects	X		
Information and communication	X		
Documentation of side effects	X		
<b>Special Techniques</b>			
Paediatrics	X		
Total Body Irradiation			X
Stereotactic			X
Total Skin Irradiation			X
IMRT			X
Other as appropriate			X

SUBJECT	LEVEL		
	1	2	3
<b>Quality assurance/control</b>			
Equipment	X		
Procedures (Evidence based)		X	
Protocols (Evidence based)		X	
Audit		X	
Incident registration		X	

### 3. CLINICAL TRAINING

#### 3.1. Content and purpose

The clinical component has been designed to complement the academic programme and runs throughout the course. The placements have been designed so that the students will be able to observe the practical application of the academic course wherever possible.

Content can be tailored to meet either National or Local needs as is deemed to be most appropriate. Phases can be introduced into a course at an appropriate time depending on the overall duration of the final programme. Assessment can be linked with academic assessment to demonstrate practical application of knowledge.

Clinical placement should constitute a minimum of 50% of the full programme.

#### SKILLS NECESSARY TO WORK IN A HOSPITAL

To be completed very early in the training. Some elements may be completed in a general hospital. The following procedures will be demonstrated to the students who will be expected to observe or participate as appropriate.

General procedures to be observed when patients attend for appointment:

- Lifting and moving techniques
- Administration of bedpans, vomit bowls, etc.
- Care and management of drugs in the hospital setting

Correct procedures when dealing with patients with infectious diseases

- Universal precautions

Correct procedures when dealing with immuno-compromised patients:

- Hygiene practices,
- Simple dressings,
- Sterile procedures,
- Oxygen administration.

Care of patients with:

- breathing difficulties,
- terminal illness,
- mental impairment,
- physical disability.
- Special care of the geriatric and paediatric patient.
- Stoma care.
- Handling of patients with bone metastases.
- Care of the patient following an anaesthetic.
- Care of lines in the intubated patient.

### **3.2. Introduction to the general hospital setting**

The purpose of this phase is:

- (i) For the students to become familiar with some of the practical applications of the academic course,
- (ii) To introduce the wider hospital setting,
- (iii) To help the students to identify the various disciplines within a hospital, their role and the importance of cooperation,
- (iv) To introduce patients in a clinical setting and begin to assimilate basic communication skills.

## SKILLS RELATED TO WORKING IN A RADIOTHERAPY DEPARTMENT

### **3.3. First clinical competency**

Introduction to the Radiotherapy Department. Time will be spent on each unit within the department.

The purpose of this phase is to:

- (i) Familiarize the students with the different units within the department and the procedures carried out on each unit;
- (ii) Enable the student to recognize and relate to the basic terminology introduced in the academic programme;
- (iii) Help to establish a sense of identity within the student group and to understand the role of the RTT in the management of cancer;
- (iv) Introduce the students to the staff of the department;
- (v) Help the student to understand team roles;
- (vi) Familiarize the students with written QA programmes within the department.

### **3.4. Second clinical competency**

The purpose of this phase is for the students to:

- (i) Begin to become competent in the manipulation of the radiotherapy equipment;
- (ii) Be able to communicate effectively with patients;
- (iii) Begin to integrate into the department as part of the radiotherapy and multidisciplinary teams;
- (iv) Begin to empathize with patients and to appreciate their own feelings in the clinical situation.

*Phases 1–3 should be completed within three months*

To achieve the competency level of phase 1–3 substantial time will be spent with on the following aspects:

- (i) Identifying the functions on the pedestal/handset and safely operating these on the treatment units;
- (ii) Identifying the functions on a control panel, indicating their purpose and safely using these when appropriate;
- (iii) Safely using the accessory equipment in the correct context;
- (iv) Correctly and safely using equipment related to patient immobilization;
- (v) Identifying, locating, understanding and safely using the radiation protection features incorporated in the treatment areas, e.g. Door interlocks, visible and audible warning signs, primary and secondary barriers, etc;
- (vi) Setting up single and parallel opposed fields under supervision;
- (vii) Assisting in the set up of multi field techniques;
- (viii) Identifying the cassettes and films commonly used for localization and verification on the simulator and treatment units;
- (ix) Demonstrating the correct procedure for developing films (daylight processing and dark room practice) and correctly unloading and reloading cassettes.

TO ACHIEVE CLINICAL COMPETENCE

### **3.5. Third clinical competency**

*To be completed over 9 months.*

The purpose of this phase is for the students to:

- (i) Demonstrate competence in the manipulation of radiotherapy equipment;
- (ii) Demonstrate an ability to anticipate the physical and psychological needs of the cancer patient and respond to them;
- (iii) Demonstrate the ability to communicate with ease with other staff involved in the multidisciplinary treatment of the cancer patient;
- (iv) Increasingly participate as a team member in all aspects of the patient's management in radiotherapy in preparation to work as a qualified radiation therapist;
- (v) Demonstrate competence in simulator procedures;
- (vi) Acquire basic computer skills;
- (vii) Participate in the development/revision of formal written quality assurance procedures/programme;
- (viii) Set up a patient on their first visit.

To achieve final competency substantial time will be spent:

- (i) Setting up multi field techniques under supervision;
- (ii) Participating in the quality control procedures in the department in accordance with the protocols;
- (iii) Simulating and localizing a target volume;
- (iv) Describing the purpose of health and safety and ionising radiation regulations;
- (v) Discussing the role of local rules and outline those in place in the different departments.

## 4. TRAINING THE TRAINERS

Training the trainers in regional centres would help to develop sustainable capacity.

### 4.1. Selection of the trainers

There was general agreement that appointing one person would meet the requirements of the appointment, but there was also concern around the advisability of establishing a training course dependent on only one person. Consideration would need to be given to funding one initially, followed by a second person soon afterwards. The ratio of trainers to students would be no more than 10 students per trainer.

In addition to the 'trainer' there must be RTTs versed in training and assessment on all the available equipment.

The recommendations for identifying a suitable trainer to be nominated are given below.

- Professional considerations:
  - Should have 3–5 years experience in Radiation Oncology post qualification
  - Must demonstrate sound knowledge and good skills as an RTT
  - Will have quality experience as an RTT
  - Have no less than 10 years of working-life ahead
- Qualities expected:
  - Enthusiasm for radiation oncology and teaching
  - Open to learning
  - Commitment
  - Responsibility
  - Good network of colleagues (e.g. lecturers in physics, anatomy, etc.)
- Other:
  - Able to leave home for minimum of a 6 month period

### 4.2. Training and support

It is recommended that the identified trainer will have the following training and support:

- Minimum of 6 months resident training at an established training centre selected for the purpose
- Assistance with establishment of a network for continued support
- Administrative support for management of the training programme

### 4.3. Roles of the trainer

Coordinate all activities related to student training.

- Plan teaching facilities in co-operation with the relevant persons. For example:
  - Classrooms
  - Access to Resource and Information (books, internet access, etc.)
  - Administration
  - Office

- Develop a curriculum from the recommended IAEA syllabus (This will receive particular attention during the fellowship)
  - Teaching methods and establishing the learning environment
  - Materials development
  - Integration of theory and clinical practice
  - Assessment (academic and clinical)
  
- Plan and manage training schedule
  - Academic component
    - Lecture and assess appropriate sections
    - Identify needs and arrange guest lecturers
  - Clinical component
    - Liaise with RTTs on units regarding teaching and assessment contribution
    - Roster students according to training needs
    - Clinical tutorials
    - Clinical assessment
  
- Coordinate CPD activities for RTTs

#### **4.4. Special considerations**

- Consideration should be given to recognition of the trainer by bestowing an appropriate title (e.g. Principle Tutor, Head of Training) and/or additional compensation.
- The trainer shall be occupied with the functions of education and training for the majority of his/her time. This includes student and staff training (e.g. CPD). All trainers must remain in close contact with the clinical department/s and are obliged to stay in touch with the clinical functions of an RTT.
- The trainers/fellows, with guidance from the training centers they are attending, must identify gaps in their knowledge. Where necessary this may lead to a request for an extension of the fellowship.



# APPENDIX I

## ASSESSMENT FORMS



**I.1. First Clinical Competency Assessment**

**Single field or parallel opposed with no beam modification**

Name .....

Student ID .....

Stage in training .....

Clinical Department .....

Date .....

Clinical Assessor .....

**Treatment related information**

Diagnosis .....

Site for treatment .....

Technique .....

Treatment unit including the type and energy of radiation .....

.....

Fields to be treated for the purpose of assessment .....

.....

Date patient consent was obtained .....

***Student's signature*** .....

I agree that the above information is correct

***Clinical Assessor's/Supervisor's signature*** .....

## PRACTICAL ASSESSMENT

(To be completed by the Clinical Assessor/Supervisor within two days of discussion with the student)

Date .....

<b>EMERGENCY PROCEDURES</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Student indicated the position of the emergency on/off switches for electrical and radiation safety			
Student indicated the location of the oxygen, resuscitation and fire fighting equipment			
Familiarity with the treatment documents of the Quality Assurance programme			

<b>TREATMENT PREPARATION</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Student correctly interprets the treatment prescription			
Student correctly prepares the treatment room			
Student correctly prepares the equipment			
Student correctly identifies the patient			
Student assesses the patient's condition and responds appropriately			
Correctly identifies the treatment site			

<b>TECHNIQUE</b>	<b>FIELD 1</b>		<b>FIELD 2</b>		<b>Not applicable</b>
	<b>YES</b>	<b>NO</b>	<b>YES</b>	<b>NO</b>	
Student correctly positions patient on the treatment couch					
Student correctly set the FSD					
Student demonstrates accurate beam alignment					
Student correctly sets the interlocks					
Student monitors the patient throughout the treatment procedure					
Student cleans the room and prepares for the next patient					

<b>CARE OF THE PATIENT</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
1. Student gave adequate explanation of procedure to the patient			
2. Student assisted the patient as required			
3. Student was considerate to the patient			
4. Student demonstrated suitable aftercare to the patient			
5. Student paid attention to the specific hygiene practices and universal precautions relevant to the patient			

**UNACCEPTABLE PERFORMANCE / FAILURE**

1. Failure to identify the location of the various items of emergency equipment.
2. Failure to check the identity of the patient and / or the site of treatment.
3. Failure to assess pre-treatment condition and to act appropriately (the assessor intervenes if he/she considers the patient unfit for treatment).
4. Preparing to give an incorrect treatment.

Please outline any special problems which arose during the assessment procedure which may have influenced the result.

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**PASS / TO BE REPEATED** .....

*Assessor's/Supervisor's signature* .....

I have seen and discussed this assessment with the Assessor / Supervisor

*Student's signature* .....

Date .....

**Multi field treatment with / without shielding**

Name .....

Student ID .....

Stage in training .....

Clinical Department .....

Date .....

Clinical Assessor .....

**Treatment related information**

Diagnosis .....

Site for treatment .....

Technique .....

Treatment unit including the type and energy of radiation .....

.....

Fields to be treated for the purpose of assessment .....

.....

Date patient consent was obtained .....

***Student's signature***

.....

I agree that the above information is correct.

***Clinical Assessor / Supervisor's signature*** .....

## PRE-SETUP ASSESSMENT

To take place between the clinical assessor and the student at a designated time prior to the formal practical assessment.

Date .....

	YES	NO
Student has reviewed all the relevant information for this patient.		

STUDENT WAS ABLE TO GIVE INFORMATION ON	YES	NO	Not applicable
<b>DISEASE</b> Diagnosis Extent of disease Common routes of spread			
<b>TREATMENT VOLUME</b> Areas included Anatomical field limits Critical structures and their radiation tolerance dose(s)			
<b>BEAM MODIFICATION</b> Used Reasons for			
<b>TREATMENT PRESCRIPTION</b> Total dose Daily fractionation Any modification for this treatment and the reasons for			
<b>PATIENT</b> Treatment intent Position Probable side effects Management of side effects Appropriate advice Any other relevant information to this individual patient Any anticipated problems			
<b>OTHER</b> Please indicate			

## PRACTICAL ASSESSMENT

(To be completed by the Clinical Assessor/ Supervisor within two days of the pre-evaluation discussion with the student).

Date .....

<b>PREPARATION (Student accurately / correctly)</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Indicates position of emergency on/off switches for electrical and radiation safety			
Indicated location of oxygen, resuscitation and fire-fighting equipment			
Notes any pre-treatment requirement Full bladder Blood count Routine clinic visit Dietician appointment To be seen on setup Port film Other (please indicate)			
Interprets treatment prescription			
Prepares the treatment room			
Prepares the equipment Treatment table Pillows / headrest / immobilization device Bolus Shielding devices			
Identifies the patient			
Evaluates patient condition and informs the radiographer of any problems			

<b>TECHNIQUE (Student demonstrates accuracy in)</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Positioning of patient			
Use of immobilization devices			
Setting FSD / SSSD / SAD			
Use of beam directional devices			
Use of beam definition devices			
Use of bolus			
Use of beam attenuation			
Beam alignment			
Student correctly sets interlocks			
Other (please indicate)			

<b>DOSE DELIVERY (Student correctly)</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Double checks dose prescription			
Indicates monitor units / time to be set			
Observes control panel throughout the treatment procedure			
Observes patient throughout the treatment procedure			
Cleans the treatment room			

<b>PATIENT CARE Student:</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Asked patient re overall well-being			
Responded adequately to problems reported by the patient			
Responded adequately to questions asked by the patient			
Reported any problems / queries to the radiographer			
Gave an adequate explanation of the treatment procedure			
Gave appropriate level of assistance to the patient in the treatment room			
Was considerate to the needs of the patient			
Paid attention to the specific hygiene practices relevant to the patient			
Demonstrated suitable aftercare			

<b>PROFESSIONALISM</b>	<b>YES</b>	<b>NO</b>	<b>Not applicable</b>
Asked questions of the radiographers appropriate to this patient and technique			
Demonstrated initiative			
Worked well as a member of the team			

**Comments**.....

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**UNACCEPTABLE PERFORMANCE / FAILURE**

- 1. Failure to identify the location of the various items of emergency equipment.
- 2. Failure to check the identity of the patient.
- 3. Failure to assess pre-treatment condition and to act appropriately (the assessor intervenes if he/she considers the patient unfit for treatment).
- 4. Preparing to give an incorrect treatment.

Please outline any special problems which arose during the assessment procedure which may have influenced the result.

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**PASS / TO BE REPEATED** .....

*Assessor's/Supervisor's signature* .....

I have seen and discussed this assessment with the Assessor / Supervisor

***Student's signature*** .....

Date .....

**Assessment of Clinical Placement**

**Name**.....

**Unit** .....

**Phase in programme** .....

**Grade awarded for professional development** .....

**Grade awarded for assessment** .....

*Course Director's/Clinical Coordinator's signature* .....

*Student's signature* .....

**TO BE ASSESSED AT THE END OF THE PLACEMENT**

**Assessment of Patient Management**

At a level appropriate to his/her stage in training the student should demonstrate an ability to:		
	<b>MAXIMUM MARKS</b>	<b>MARKS AWARDED</b>
Interpret information from treatment sheet and patients notes	<b>10</b>	
Carry out appropriate preparation of treatment room and equipment	<b>10</b>	
Discuss the merits or otherwise of the treatment plan for individual patients	<b>10</b>	
Recognise signs of reactions to treatment	<b>10</b>	
Reassure and support patient throughout the treatment procedure	<b>10</b>	
Communicate effectively with patients, relatives and other professionals	<b>10</b>	
Appropriately record details of treatment and other relevant information	<b>10</b>	
<b>TOTAL MARKS</b>	<b>70</b>	

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

**Assessment of Professional Development**

Score on a scale of 1 to 5. (1 unsatisfactory and 5 excellent)					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Professional appearance					
Reliability					
Initiative, including willingness to learn enquire/ research while on placement					
General handling and positioning of patients					
Professional manner					
Ability to work independently and as part of a team					
Attention to safety aspects					

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

Examples of assessment criteria. Centres will develop their own criteria based on local practice.

## **PATIENT MANAGEMENT**

### **Interprets information**

Correct identification / need for blood counts / clinic visit, etc.

### **Implements preparation**

Field size / accessory equipment, etc.

### **Merits of treatment plan**

Aim of treatment / reasons for modifications / lead, etc.

### **Reactions**

Aware of normal and reports abnormal to radiographer

### **Reassurance and support of patient**

Appropriate comments and information

### **Communication**

Clear / appropriate / all patients / staff / others

### **Records**

Accuracy / relevance / date / respect for confidentiality

## **PROFESSIONAL DEVELOPMENT**

### **Professional Appearance**

Uniform / overall neatness, etc.

### **Reliability**

Attendance / punctuality / accurate reporting / carrying out tasks

### **Initiative**

Ability / willingness to take action. Asking questions / seeking help

### **General handling skills**

Positioning of patient / accurate setting up, care with lead blocks, etc.

### **Professional manner**

Courtesy / participation in discussion / empathy / common sense

### **Independence / teamwork**

Relevant to stage in training / less dependent on instructions

### **Safety**

Includes radiation awareness, fire prevention, prevention of cross infection, etc.

### **Comments**

Comments should be included to explain the scores / marks from each section and to help guide students on how to improve in these areas and are invaluable to school staff in co-ordinating assessments and placements

Student comments will provide feedback to clinical staff and to school staff on the placement in general.

**I.2. Second Clinical Competency Assessment**

**Name** .....

**Unit** .....

**Phase in programme** .....

**Dates** .....

**Number of days absent** .....

**Comment on overall progress**

**Mark for specific assessment** .....

*Course Director's/Clinical Supervisor's signature* .....

*Student's signature* .....

**TO BE ASSESSED AT THE END OF THE PLACEMENT**

## Assessment of Technical Competence

At a level appropriate to his/her stage in training the student should demonstrate an ability to:		
	<b>MAXIMUM MARKS</b>	<b>MARKS AWARDED</b>
Identify the functions on the pedestal/handset	<b>10</b>	
Safely operate the pedestal/handset	<b>10</b>	
Identify the functions on a control panel and indicate their purpose	<b>10</b>	
Correctly and safely under supervision set the control panels	<b>10</b>	
Safely use the accessory equipment in the correct context	<b>10</b>	
Correctly and safely use the immobilization equipment	<b>10</b>	
Identify and locate the radiation protection features in the treatment areas	<b>10</b>	
Set up a single field under supervision	<b>10</b>	
Set up a parallel opposed treatment under supervision	<b>10</b>	
Assist in the set up of a multi field treatment	<b>10</b>	
Identify the cassettes and films used in the simulator	<b>10</b>	
Identify the cassettes and films used in the treatment unit	<b>10</b>	
Demonstrate the correct procedure for developing films	<b>10</b>	
Demonstrate the correct procedure for unloading and reloading cassettes	<b>10</b>	
<b>TOTAL MARKS</b>	<b>140</b>	

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

## Assessment of Patient Management

At a level appropriate to his/her stage in training the student should demonstrate an ability to:		
	<b>MAXIMUM MARKS</b>	<b>MARKS AWARDED</b>
Interpret information from treatment sheet and patients notes	<b>10</b>	
Carry out appropriate preparation of treatment room and equipment	<b>10</b>	
Discuss the merits or otherwise of the treatment plan for individual patients	<b>10</b>	
Recognise signs of reactions to treatment	<b>10</b>	
Reassure and support patient throughout the treatment procedure	<b>10</b>	
Communicate effectively with patients, relatives and other professionals	<b>10</b>	
Appropriately record details of treatment and other relevant information	<b>10</b>	
<b>TOTAL MARKS</b>	<b>70</b>	

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

## Assessment of Professional Development

Score on a scale of 1 to 5. (1 unsatisfactory and 5 excellent)					
	1	2	3	4	5
Professional appearance					
Reliability					
Initiative, including willingness to learn enquire / research while on placement					
General handling and positioning of patients					
Professional manner					
Ability to work independently and as part of a team					
Attention to safety aspects					

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

### **I.3. Third Clinical Competency Assessment**

**Name** .....

**Unit** .....

**Phase in programme** .....

**Dates** .....

**Number of days absent** .....

**Comment on overall progress**

**Mark for specific assessment** .....

*Course Director's/Clinical Supervisor's signature* .....

*Student's signature* .....

**TO BE ASSESSED AT THE END OF THE PLACEMENT**

## Assessment of Technical Competence

At a level appropriate to his/her stage in training the student should demonstrate an ability to:		
	<b>MAXIMUM MARKS</b>	<b>MARKS AWARDED</b>
Set up multi field treatments under supervision	<b>10</b>	
Participate in the quality control programme	<b>10</b>	
Simulate and localise a target volume	<b>10</b>	
Describe the purpose of health and safety regulations	<b>10</b>	
Describe the purpose of ionising radiation regulations	<b>10</b>	
Discuss the local roles in the departments	<b>10</b>	
Complete a basic treatment plan	<b>10</b>	
Set up a patient on their first visit	<b>10</b>	
<b>TOTAL MARKS</b>	<b>80</b>	

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

## Assessment of Patient Management

At a level appropriate to his/her stage in training the student should demonstrate an ability to:		
	<b>MAXIMUM MARKS</b>	<b>MARKS AWARDED</b>
Interpret information from treatment sheet and patients notes	<b>10</b>	
Carry out appropriate preparation of treatment room and equipment	<b>10</b>	
Discuss the merits or otherwise of the treatment plan for individual patients	<b>10</b>	
Recognise signs of reactions to treatment	<b>10</b>	
Reassure and support patient throughout the treatment procedure	<b>10</b>	
Communicate effectively with patients, relatives and other professionals	<b>10</b>	
Appropriately record details of treatment and other relevant information	<b>10</b>	
<b>TOTAL MARKS</b>	<b>70</b>	

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

## Assessment of Professional Development

Score on a scale of 1 to 5. (1 unsatisfactory and 5 excellent)					
	1	2	3	4	5
Professional appearance					
Reliability					
Initiative, including willingness to learn enquire / research while on placement					
General handling and positioning of patients					
Professional manner					
Ability to work independently and as part of a team					
Attention to safety aspects					

**Comments of clinical supervisor:**

**Comments of student:**

*Clinical Supervisor's signature* .....

*Student's signature* .....

**Assessment of Basic Clinical Competence and Technical Skill**

**Please comment on and score out of 10 each of the following:**

<b>Student accuracy and safety in</b>	<b>Mark awarded</b>
<b>Setting up patients</b>	
<b>Using accessory equipment</b>	
<b>Using unit controls</b>	
<b>Setting time, dose, etc.</b>	
<b>Setting interlocks</b>	
<b>Additional (please name)</b>	

Examples of assessment criteria. Centres will develop their own criteria based on local practice.

## **PATIENT MANAGEMENT**

### **Interprets information**

Correct identification / need for blood counts / clinic visit, etc.

### **Implements preparation**

Field size / accessory equipment, etc.

### **Merits of treatment plan**

Aim of treatment / reasons for modifications / lead, etc.

### **Reactions**

Aware of normal and reports abnormal to radiographer

### **Reassurance and support of patient**

Appropriate comments and information

### **Communication**

Clear / appropriate / all patients / staff / others

### **Records**

Accuracy / relevance / date / respect for confidentiality

## **PROFESSIONAL DEVELOPMENT**

### **Professional Appearance**

Uniform / overall neatness, etc.

### **Reliability**

Attendance / punctuality / accurate reporting / carrying out tasks

### **Initiative**

Ability / willingness to take action. Asking questions / seeking help

### **General handling skills**

Positioning of patient / accurate setting up, care with lead blocks, etc.

### **Professional manner**

Courtesy / participation in discussion / empathy / common sense

### **Independence / teamwork**

Relevant to stage in training / less dependent on instructions

### **Safety**

Includes radiation awareness, fire prevention, prevention of cross infection, etc.

### **Comments**

Comments should be included to explain the scores / marks from each section and to help guide students on how to improve in these areas and are invaluable to school staff in co-ordinating assessments and placements.

Student comments will provide feedback to clinical staff and to school staff on the placement in general.

**Patient Treatment Profile**

**(To be completed as part of the clinical assessment process)**

**NAME** .....

**PHASE IN TRAINING** .....

**PROFILE NUMBER** .....

**SITE** .....

**DATE** .....

**Patient Pre-Diagnosis History**

**AGE** .....

**SEX** .....

**PRESENTING SIGNS / SYMPTOMS:**

**INVESTIGATIONS CARRIED OUT:**

**DIAGNOSIS** .....

**STAGE / GRADE** .....

**TREATMENT**

**PRIMARY TREATMENT OPTION**

(If not radiotherapy then outline briefly)

**RADIOTHERAPY MANAGEMENT**

TREATMENT UNIT .....

RADIATION TYPE .....

RADIATION ENERGY .....

FIELD ARRANGEMENT (text and diagram)

TOTAL DOSE .....

FRACTIONATION .....

OVERALL DURATION .....

## **Setting Up Information**

PATIENT POSITION:

METHOD OF IMMOBILIZATION:

BEAM MODIFICATION:

DRAW A LABELLED ISODOSE DISTRIBUTION:

## **Patient Management**

EXPLANATION GIVEN TO THE PATIENT BEFORE THE FIRST TREATMENT:

ANTICIPATED REACTIONS:

ROUTINE INVESTIGATIONS:

(Please give normal values and an indication of minimal acceptable levels for treatment).

DAILY MANAGEMENT:

INSTRUCTIONS / ADVICE ON COMPLETION OF TREATMENT:

ADDITIONAL COMMENTS / OBSERVATIONS:

*Clinical Supervisor's signature* .....

*Student's signature* .....

Clinical Assessor's signature .....

*Signature of Clinical Coordinator / Course Director* .....

#### **I.4. Evaluation of Clinical Placement by the Student**

Evaluate the effectiveness of this clinical placement in terms of educational value and professional development.

**Name** .....

**Phase** .....

**Date** .....

**Department / Unit** .....

**Please complete the following evaluation sheet by ticking the appropriate number. A score of 5 indicates very helpful and a score of 1 unhelpful.**

<b>TECHNICAL SKILLS</b>	extremely helpful			unhelpful	
Patient setup	5	4	3	2	1
Using accessory equipment	5	4	3	2	1
Using unit controls	5	4	3	2	1
Setting time, dose etc	5	4	3	2	1
Other (please name)	5	4	3	2	1

<b>MANAGEMENT SKILLS</b>	extremely helpful			unhelpful	
Understanding of the appointment system	5	4	3	2	1
Recording data - treatment sheets etc	5	4	3	2	1
Checking against treatment plans	5	4	3	2	1
Other (please name)	5	4	3	2	1

**PSYCHO-SOCIAL SKILLS**

extremely helpful

unhelpful

**Interactions with patients with respect to**

Side effects	5	4	3	2	1
Other aspects of treatment	5	4	3	2	1
Anxiety etc	5	4	3	2	1
Social problems	5	4	3	2	1
Other (please name)	5	4	3	2	1

**Please list the anatomical sites you observed being treated during this placement:**

.....  
.....  
.....  
.....  
.....

**Duration of placement**

Too long ..... Too short

**COMMENTS / DISCUSSION**

**Please comment on the following:**

**Did you find the staff helpful?**

**What were the most beneficial aspects of this placement?**

**What were the least beneficial aspects of this placement?**

**Suggestions for improvement:**

**Additional comments:**

*Course Director's/Clinical Supervisor's signature* .....

*Student's signature* .....

## I.5. Assessment of Clinical Competency

### EVIDENCE OF COMPETENCY

The basic requirement to pass the clinical component of the programme and be eligible to enter into professional practice.

#### Manual Dexterity / Technical Ability

TASK	Year	Pass		Fail
		Attempt		
		1 <sup>st</sup>	2 <sup>nd</sup>	
Familiarisation with the hospital				
Lifting and moving competency				
Aware of fire drill procedures and equipment positions				
Identification of location and use of emergency box				
Correct patient care procedures				
Accurate use of control panels for treatment couches				
Accurate use of unit control panels				
Identified emergency stop buttons				
Safe patient management				
Formal assessment				

COMMENTS .....

.....

.....

.....



**Level of Competency Assessment**

**TECHNICAL ABILITY**

TASK	GRADE			
	I	II	III	FAIL
Patient positioning				
Use of immobilization devices				
Setting FSD				
Use of beam directional devices				
Use of beam definition devices				
Addition of beam modification				
Beam alignment				
<b>TOTAL</b>				

**Comments** .....

.....

.....

**PATIENT CARE**

TASK	GRADE			
	I	II	III	FAIL
Good use of questioning				
Approachable				
Considerate				
Demonstrated observational skills				
Gave adequate explanation of Procedure				
Advised re side effects and Management				
<b>TOTAL</b>				

**Comments** .....

.....

.....

**TEAM SKILLS**

TASK	GRADE			
	I	II	III	FAIL
Adaptable				
Accepts responsibility				
Demonstrates initiative				
Discusses clinical issues				
Considerate to needs of other Team members				
Versatile				
<b>TOTAL</b>				

**Comments**

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**KNOWLEDGE AND UNDERSTANDING**

Assessment of knowledge on specific techniques taught in the academic programme and consolidated during clinical placement.

SITE	GRADE			
	I	II	III	FAIL
Breast				
Lung				
Prostate				
Colon				
Cervix / Uterus				
Oesophagus				
Bone metastases				
<b>TOTAL</b>				

**Comments** .....

.....

.....

.....

**SKILLS NECESSARY TO WORK IN A HOSPITAL**

**To be completed by the end of the programme.**

**Name** .....

**Student ID** .....

**Clinical Department** .....

**Objectives**

Become familiar with:

- The practical aspects of patient care.
- The hospital setting.
- The various disciplines within the hospital.
- The importance of interdisciplinary co-operation.
- Patients in a clinical setting.
- Basic communication skills.

The first four to six weeks of clinical placement should take place in a ward or clinic area and it is envisaged that most of the procedures will be observed during this period. Students are expected to actively participate in designated procedures before completing the full programme.

## Observation Checklist

Student should observe all the procedures identified and satisfy the assessor that they understand both principles and practice.

	<b>Date</b>	<b>Signed</b>
General procedure when patients attend for an appointment		
Correct procedure when dealing with patients with infectious diseases		
Universal precautions		
Hygiene practices		
Simple dressings		
Sterile procedures		
Oxygen administration		
Stoma care		
Care of patient following an anaesthetic		
Care of lines in the incubated patient		
Care and management of drugs in the hospital setting		

## Observation and participation checklist

Student should observe and participate in all the procedures identified and satisfy the assessor that they understand both principles and practice.

	Date		Signature
	Observed	Participated	
<b>Lifting and moving techniques</b>			
Administration of Bedpans			
Vomit bowls			
Care of patients with Breathing difficulties			
Terminal illness			
Mental impairment			
Physical disability			
Special care of Geriatric patient			
Paediatric patient			
Handling patients with bone metastases			

Comments

The student has observed and participated in all the identified tasks.

*Course Director's signature* .....

*Student's signature* .....

**I.6. Cumulative Total**

	<b>GRADE</b>			
	<b>I</b>	<b>II</b>	<b>III</b>	<b>FAIL</b>
<b>TECHNICAL ABILITY TOTAL</b>				
<b>KNOWLEDGE AND UNDERSTANDING TOTAL</b>				
<b>PATIENT CARE TOTAL</b>				
<b>TEAM SKILLS TOTAL</b>				
<b>FINAL TOTAL</b>				

**Comments**

.....

.....

.....

**FINAL GRADE AWARDED** .....

*Signed* .....

*Date* .....



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**Regional (AFRA) Training Workshop**

Fez, Morocco: 26 – 30 May 2003

**RCA-AFRA Task Group Meeting**

Quatre Bornes, Mauritius: 14 – 18 October 2002