



# UNION EUROPÉENNE DES MÉDECINS SPÉCIALISTES EUROPEAN UNION OF MEDICAL SPECIALISTS

*Association internationale sans but lucratif*

*International non-profit organisation*

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## Training Requirements for the Specialty of Radiation Oncology

*European Standards of Postgraduate Medical Specialist Training*

*(Old chapter 6)*

The European board of Radiotherapy, radiotherapy section of the UEMS, who are the monitoring authority for training of radiation oncology (radiotherapy) in the EU have revised and updated the CHARTER on TRAINING of MEDICAL SPECIALISTS in the EU, REQUIREMENTS for the SPECIALTY RADIATION ONCOLOGY (RADIOTHERAPY) from 2002. This is based on and an integrated part of the “RECOMMENDED ESTRO CORE CURRICULUM FOR RADIATION ONCOLOGISTS/ RADIOTHERAPISTS, 3RD EDITION”, approved April 2010 and endorsed by 28 European National Societies for Radiation Oncology, Radiotherapy or Clinical Oncology (Radiother Oncol. 2012 Apr;103(1):103-8). The present document is developed by the UEMS Section of Radiotherapy based on “Training Requirements for the Specialty of X, European Standards of Postgraduate Medical Specialist Training” endorsed by the UEMS, October 2012 (UEMS 2012/29) and in collaboration with the European Society for Radiation & Oncology (ESTRO).

### Introduction

Radiotherapy (Radiation Oncology) is the branch of clinical medicine that uses ionising radiation, either alone or in combination with other modalities, for the treatment of patients with malignant or other diseases. It may be practiced as an independent oncological specialty or may be integrated in the broader practice of clinical oncology.

Radiotherapy (Radiation Oncology) includes responsibility for the diagnosis, treatment, follow up, and supportive care of the cancer patient, and forms an integral part of their multidisciplinary management and investigation.

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In many countries this specialized area of medicine is at the present time recognised under the term ‘radiation oncology’. In this document, however the double terminology ‘radiotherapy/ radiation oncology’ will be used since, as defined by the European Union of Medical Specialists (UEMS). Radiation oncology excludes non-oncological treatment for benign disease whereas radiotherapy may also be used for the treatment of non-malignant conditions. In the present document “external beam radiotherapy” will encompass the various forms of delivery (2D, 3D, IMRT, stereotactic RT) and types of beams (photons, electrons and various particles).

Due to different national regulations, this curriculum primarily describes the knowledge and skills for the use of ionising rays and each national society should define the level and knowledge of skills necessary to contribute to combined modality treatment with systemic therapies in their country. It is recommended that all radiation oncologists should have at least a basic knowledge of medical oncology, being able to recognize and initiate treatment of medical oncology emergencies and taking clinical responsibility for the delivery of radiation therapy together with systemic agents.

## **I. TRAINING REQUIREMENTS FOR TRAINEES**

### **1. Content of training and learning outcome**

#### **Competencies required of the trainees**

Medical trainees in Radiotherapy/radiation oncology are doctors who have completed their general professional training as physicians and are in an accredited training program to become recognized medical specialists.

The training program is based on competencies, which is the ability to execute a specific professional activity adequately, by integrating and applying necessary knowledge, skills and professionalism (attitudes).

The objective of the training programme is to educate and train physicians in the medical specialty of Radiotherapy (Radiation Oncology) up to the level of competency allowing them to practice as an independent specialist.

These competencies are described for the roles of a physician indentified by the Canadian CANMEDS system (<http://rcpsc.medical.org/canmeds/index.php>)

In the curriculum we distinguish competencies which can be considered as general competencies applicable to all aspects of the profession and those which are specific. All described learning outcomes and items are considered as minimum requirements.

At the beginning of the training, the trainee should be presented with the curriculum and a written individual training programme. The training programme should describe the goals of the training, the time frame of each module and how the responsibilities for the training are distributed among the staff at the training institutions. The training programme should correspond to the requirements outlined in the European core curriculum and to specific national requirements.

During the training the trainee should become gradually more responsible for patient care, with increasing autonomy and less dependent on supervision. A portfolio or logbook clearly documenting the clinical activities of the trainee is suggested as a tool to define the clinical responsibilities the trainee is authorized to undertake during the training.

**a. Theoretical knowledge**

The main domains of theoretical knowledge are: Biology of cancer, Radiobiology, Basic radiation physics, Radiation physics applied in radiation therapy (RT), Radioprotection, Biological and targeted treatments, Clinical research and measurement of treatment outcome, Specificity/sensitivity/ validity/power, Basic Management and Economics of radiation therapy. The theoretical knowledge for each item (and its subheadings) is ranked according to the cognitive domains using Bloom's taxonomy. For detailed description, see the European core curriculum of Radiation Oncology.

In many cases teaching in these subjects will be performed in formal national or international teaching courses. Examples of a modular curriculum are the basic teaching courses offered by ESTRO: (Radiobiology, Molecular Oncology, Physics, Evidence Based Radiation Oncology, Brachytherapy, Imaging for Target Volume

Determination). ESTRO School aims at offering courses that includes each theoretical item as described in the core curriculum.

**b/c. Practical and clinical skills and competences**

Competences or ‘Learning Outcomes’ means statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence.

The general part of the core curriculum in Radiation Oncology describes the learning outcomes (LO) subdivided in the seven competencies according to the CANMEDS system:

1. Medical expertise: Identifying 28 LO for becoming a medical specialist.
2. Communication: Includes four LO for communicative training.
3. Collaboration: Consists of six LO for adequate collaborative skills.
4. Knowledge and science: Seven LO describing minimal academic qualifications.
5. Health advocacy/Social actions: Covered by six LO.
6. Management/Organisation: Seven LO of management of the professional life
7. Professionalism: Seven LO necessary for acting as a professional specialist.

For a detailed description of the European core curriculum of Radiation Oncology: <http://www.estro-education.org/europeantraining/Pages/EuropeanCurricula.aspx>

**2. Organisation of training**

**a. Schedule of training**

The training period should be sufficient to obtain the competences to become an independent specialist. In general, the training period should be at least five years full time or if part-time, an equivalent period. At least 60% of the programme must be spent in clinical work. Trainees should actively participate in journal clubs and research conferences.

Trainees should be encouraged to engage in a research project under supervision of experienced staff (experimental research or clinical research).

Trainees should be encouraged to spend a period of their training in another institution (national or international) with an accredited teaching programme, which is accepted by the trainee's national society.

**b. Curriculum of training**

The curriculum of training is described in detail in the European core curriculum of Radiation Oncology. In short: it consists of a curriculum of general competencies where learning outcomes are described as knowledge and skills/expertise divided into the seven competencies according to the CANMEDS system and a specific part describing the theoretical knowledge ranked according to the cognitive domains using Bloom's taxonomy. For a detailed description of the European core curriculum of Radiation Oncology:

<http://www.estro-education.org/europeantraining/Pages/EuropeanCurricula.aspx>

The core curriculum will be regularly updated by UEMS section of radiation oncology/European Board of Radiotherapy and partners involved in education and training in Europe.

**c. Assessment and evaluation**

Assessment: *Process by which information is obtained relative to some known objective or goal. (a broad term that includes testing)*

Evaluation: *Inherent in the idea of evaluation is "value." Process designed to provide information that will help us make a judgment about a given situation*

Evaluation of competencies is an ongoing process taking place from the very start of training and therefore in many ways is different from the classical examination. When evaluating competencies it is often necessary to have a variety of tools that can be used regularly and it is recommended that several evaluators assess the trainee in order to get an objective and "true" picture of the trainee's skills as possible.

When evaluating competencies one must bear in mind that "scoring" of competencies is probably of minor importance and it is often more important to discuss the assessment with the trainee in order to secure progress in knowledge and skills.

It is realised that assessment of competences can be done in many ways and each country should decide on criteria that determine successful training or failure. The list below describes possible methods that could be gradually integrated in departments to evaluate trainees. It is up to the national societies and/or authorities to decide which methods should be used. ESTRO wishes to follow the development of and experience gained with the different assessment tools and will obtain an update of this information for future editions of the core curriculum.

### **Testing**

Regular testing takes place in order to evaluate whether the resident in training satisfies the required competencies, and as support for the learning process. The resident in training is tested throughout the duration of the training.

The resident in training is tested by the local trainers on a regular basis. Possible tools for evaluation are feedback at the work place, 360 degree feedback, workplace assessment/mini-CEX (Clinical Examination eXercise), the portfolio, the logbook and the progress interview; described in detail in the curriculum: <http://www.estro-education.org/europeantraining/Pages/EuropeanCurricula.aspx>

### **Documentation of training experience**

Each trainee should keep a portfolio/logbook documenting his/her training experience. For this purpose a standardised European portfolio/logbook developed by ESTRO and UEMS covering this core curriculum has been developed. Use of this portfolio/logbook or a national equivalent which covers at least the items of the European Logbook is recommended. The programme director should review the portfolios/logbooks with the trainee at least twice yearly.

### **Further recommendations**

By analogy to the European law guaranteeing reciprocity in accepting professional diplomas in all member states, it is suggested that training periods undertaken by trainees according to the European core curriculum in an accredited training programme in any member state should be accepted as equivalent to the same period of training in their own state.

It is recommended that the appropriate bodies in the European Union and the United States of America engage in negotiations on reciprocity in the acceptance of the residency training in Radiotherapy (Radiation oncology).

The European core curriculum in Radiotherapy (Radiation Oncology) will be regularly reviewed and updated.

**d. Governance**

Responsibility for licensing doctors to practice in Radiotherapy (Radiation Oncology) varies from one European country to another. Licensing should be based on objective assessment of completion of a training programme that fulfils the national guidelines.

**II. TRAINING REQUIREMENTS FOR TRAINERS**

**1. Process for recognition as trainer**

The programme director must be a highly qualified radiation oncologist with considerable experience in trainee education and in organisational activities. He should appoint several radiation oncologists/radiotherapists radiation oncologists to be responsible for teaching and training. Training of trainers is according to national regulations and otherwise covered by the EU Directive on Professional Qualifications.

**2. Quality management for trainers**

It is the responsibility of programme director to ensure a high quality of the trainers. If the minimum requirements for trainers cannot be met by a single institution, several training institutions should combine and offer an integrated programme that meets these minimal requirements. This should be done according to national guidelines and legislation.

### **III. TRAINING REQUIREMENTS FOR TRAINING INSTITUTIONS**

#### **1. Process for recognition as training center**

##### **a. Requirement on staff and clinical activities**

If the minimum requirements for training institutions set in the core curriculum cannot be met by a single institution, several training institutions should combine and offer an integrated programme that meets these minimal requirements. Licensing for training institutions or integrated programmes should depend on fulfilment of their national guidelines

##### **Radiotherapy (Radiation Oncology) resources in training institutions**

There should be megavoltage machines available, at least one with high-energy electrons, access to a dedicated CT-scanner, computerised treatment planning, a mould room and technical support. This should include appropriate dosimetry, radiotherapy protection equipment and appropriate patient treatment aids. Trainees should have an opportunity to become at least familiar with brachytherapy and IMRT. This can be organised by collaboration with institutions in which these treatments are concentrated. The department should have beds for inpatients or at least sufficient access to them in other departments. Teaching institutions should establish quality control programmes for patient care, treatment decisions, and outcome in a range of cancer sites.

To ensure adequate numbers and case-mix of patients, a minimum of 500 oncology patients should be irradiated yearly in the parent institution or the integrated programme. An adequate case mix for each trainee should be ensured by continuous monitoring by means of a portfolio or logbook.

Organisational aspects of patient care and practical teaching vary widely between European institutions. In some institutions the patient is followed by the trainee for the whole process from the first visit over treatment planning and applications to follow-up, whereas in other institutions trainees see patients for only part of the process. For part of their training period they will see only patients during their first presentation, during other periods they perform solely treatment planning, and in other periods, follow-up. For this reason the number of patients seen by a trainee is defined as the equivalent to a patient undergoing the complete process (full case equivalent). It is felt that the recommended number of full case



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equivalents seen by each trainee should be at least 450 during the total clinical Radiotherapy (Radiation Oncology) rotation. A trainee should not treat more than 250 full case equivalents per year to assure a good equilibrium between work load and the aims of the training.

## Programme director

Each training institution or integrated programme should appoint a single programme director responsible for trainee education. It is considered preferable that the roles of programme director and chairman of the department are held by different people. The programme director is responsible for the general administration, the structure and the content of the programme. The programme director ensures that the programme fulfils the criteria in this core curriculum and the national requirements. The programme director must be a highly qualified radiation oncologist with considerable experience in trainee education and in organisational activities. The programme director should organise regular documented meetings with the teaching staff to review programme goals and objectives, the programme effectiveness and future developments. At least one trainee representative should participate in these.

## Medical teaching staff

Adequate staffing levels in the radiotherapy (radiation oncology) departments are essential for training. Several radiation oncologists/radiotherapists radiation oncologists responsible for teaching should be appointed. These teaching staff members need to devote a considerable proportion of their professional time to the teaching programme. It is preferable that the number of trainees does not exceed the number of full time equivalent staff radiation oncologists/radiotherapists. Sufficient supervision should be guaranteed.

## Physics teaching staff

ESTRO has, in cooperation with the European Federation of Physics in Medicine (EFOMP), made recommendations previously on minimal staffing levels for the safe provision of a routine radiotherapy (radiation oncology) physics service (REF). Full time medical physics support must be available in teaching institutions. Medical physics staff members responsible for teaching should be appointed. Medical

trainees should be taught dosimetry and the dosimetric aspects of treatment planning under the supervision of accredited medical physicist working in the field of radiotherapy, whereas the general principles of treatment planning should be learned under the clinical supervision of an experienced radiation oncologist. The trainees should also be familiar with the safety procedures and quality assurance in the training institution and the national regulations pertaining to these.

*(Radio) biology teaching staff*

Teaching institutions or integrated programmes should aim to have guaranteed access to a cancer biology laboratory and a chance to interact with its scientific staff. A minimum requirement is to provide training in radiobiology by formal accredited national and international courses.

The training programme must provide the trainee with in-depth knowledge in the basic and clinical sciences in the field of radiotherapy (radiation oncology) and must train the trainee to be skilful in the clinical practice of radiotherapy (radiation oncology).

Training institutions or integrated programmes must schedule regular conferences (e.g. new patients, planning conferences, and problematic cases conferences), teaching rounds, case presentations and scheduled lectures. These teaching activities must include trainee participation that increases with experience.

Training institutions should facilitate access to teaching courses on a national or international level. These courses should attempt to put specific items of the European core curriculum in an international perspective. These courses, like some ESTRO courses, should therefore be sufficiently wide-ranging to offer different point of views on the same subject, should facilitate interactions of trainees of different countries and circulation of radiation oncologists in Europe. These recommended teaching courses should be adapted according to the national requirements and the specific needs of the individual training programme. To add a European dimension to the education, it is also recommended that at least one teaching courses attended should be at a European level. A further

recommendation is that during training each trainee participates in at least one international scientific meeting on radiotherapy (radiation oncology).

Teaching courses in radiation protection have to be provided according to national regulations.

Training institutions must allow the trainees sufficient protected time during their working hours for study of the literature, preparation of case presentation etc. It is suggested that on average a minimum of 10% of the weekly work time is appropriate. The remaining 90% of time should be mainly devoted to supervised and unsupervised clinical activities in appropriate proportions.

***Practical teaching sessions***

Member of the teaching staff should schedule regular practical teaching sessions with the trainees working directly under their supervision. During these sessions cases treated by the trainee should be reviewed. There should be a continuous feed-back to the trainees about their achievements in this specific field of training. It is felt that at least one practical training session between the teacher and the trainee should be scheduled per week (see page 28-9).

**b. Requirement on equipment, accommodation**

Adequate medical services must be available in medical oncology, surgical oncology and other oncology-related specialties and specific services. Access to current imaging techniques, pathology and clinical genetics, relevant to oncology should be available.

A sufficient variety of journals, reference books, and resource materials (or electronic equivalents) pertinent to radiotherapy (radiation oncology) and associated fields in oncology (basic sciences), and general medicine must be readily accessible for the trainee. The training institution should provide ready access to a computerised search system and rapid access to databases in medicine to permit literature reviews.

## 2. **Quality Management within Training institutions**

### **Accreditation**

Training institutions must be accredited according to their national regulations. The training institutions, either alone or in cooperation with other regional departments, should be adequately equipped to support both the workload and range of Radiotherapy (Radiation Oncology) services required for training including new technologies and novel techniques. Training institutions should be able to fulfil the requirements of the European core curriculum.

### **Clinical Governance and Structure for coordination of training**

Each training institution or integrated programme should appoint a single programme director responsible for trainee education. It is considered preferable that the roles of programme director and chairman of the department are held by different people. The programme director is responsible for the general administration, the structure and the content of the programme. The programme director ensures that the programme fulfils the criteria in this core curriculum and the national requirements. The programme director must be a highly qualified radiation oncologist with considerable experience in trainee education and in organisational activities.

### **Manpower planning**

Adequate staffing levels in the radiotherapy (radiation oncology) departments are essential for training. Several radiation oncologists/radiotherapists radiation oncologists responsible for teaching should be appointed. These teaching staff members need to devote a considerable proportion of their professional time to the teaching programme. It is preferable that the number of trainees does not exceed the number of full time equivalent staff radiation oncologists/radiotherapists. Sufficient supervision should be guaranteed.

### **Regular report**

The programme director should organise regular documented meetings with the teaching staff to review programme goals and objectives, the programme effectiveness and future developments. At least one trainee representative should participate in these.

**External auditing**

Regular external audit of the training programme is recommended. Where no national audit system is established it is recommended that programmes request audit by the European Board of Radiotherapy Audit System endorsed by ESTRO and UEMS. As soon as some national education programmes have been audited, these programmes may audit the other national programmes.

**Transparency of training programmes**

At the beginning of the training, the trainee should be presented with the curriculum and a written individual training programme. The training programme should describe the goals of the training, the time frame of each module and how the responsibilities for the training are distributed among the staff at the training institutions. The training programme should correspond to the requirements outlined in the European core curriculum and to specific national requirements.

A portfolio or logbook clearly documenting the clinical activities of the trainee is suggested as a tool to define the clinical responsibilities the trainee is authorized to undertake during the training. For this purpose a standardised European portfolio/logbook developed by ESTRO and UEMS covering the core curriculum has been developed. Use of this portfolio/logbook or a national equivalent which covers at least the items of the European Logbook is recommended.

**Framework of approval**

Responsibility for licensing doctors to practice in Radiotherapy (Radiation Oncology) varies from one European country to another. Licensing should be based on objective assessment of completion of a training programme that fulfils the national guidelines.