Radiotherapy and Oncology 141 (2019) 1–4

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Original Article

Recommended ESTRO Core Curriculum for Radiation Oncology/Radiotherapy 4th edition

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ARTICLE INFO

Article history:
Received 12 August 2019
Received in revised form 14 August 2019
Accepted 16 August 2019
Available online 5 September 2019

Keywords:
ESTRO
Radiotherapy
Radiation oncology
CanMEDS
Specialist education and training
Oncology education and training

ABSTRACT

Introduction: In 2017 it was decided to revise the European Core Curriculum for Radiation Oncology/Radiotherapy to produce a 4th edition. The aims of the ESTRO curriculum are to develop comparable standards for training across Europe and to facilitate free movement of specialists across borders. It is also hoped that it will improve the level of training across Europe and will make the non-medical expert roles more explicit.

Materials and methods: A wide range of stakeholders including National Society representatives, trainees, recently appointed specialists, members of the European Union Medical Specialists Radiotherapy section, an RTT, a radiobiologist, a physicist and lay members from ESTRO staff developed and commented on iterations of the curriculum.

Results: The 4th edition is based on the CanMEDS 2015 framework and identifies 14 Entrustable Professional Activities (EPAs) and the competencies required to perform these. The manager role is replaced by competencies related to leadership. The levels of proficiency required for tumour sites is defined as levels of EPAs.

Conclusions: It is hoped that the inclusive method of developing the 4th edition has resulted in a document that will have utility in the wide range of environments in which radiation oncology is practised in Europe.

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

The role of a curriculum is not just to define the content of a course but to define the intended product of training; the aims

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https://doi.org/10.1016/j.radonc.2019.08.013
0167-8140/

and objectives; how the content should be organised; the educational strategies and teaching methods to be employed; assessment; communication regarding the curriculum; the educational environment to be fostered and the management of the educational programme [1]. The aims of the ESTRO Core Curriculum are to develop comparable standards for training across Europe and to facilitate free movement of specialists across borders. It is also hoped that it will improve the level of training across Europe and will make the non-"medical expert" roles more explicit.

The European Society for Radiotherapy and Oncology (ESTRO) developed a "Minimum Curriculum for the Theoretical Education in Radiation Oncology in Europe" in 1991 [2]. This Core Curriculum played a pivotal role in establishing comparable standards for training across Europe. With the marked evolution in radiation oncology technology and methods a second edition was published in 2004 [3]. This was endorsed by thirty-five National Societies. It was integrated into legal or national guidelines in several European countries and provided a significant step towards harmonisation across Europe. The third edition published in 2011, endorsed by 28 national societies, changed the focus from theoretical to competency based education, defining the minimum observable abilities radiation oncologists/radiotherapists needed for optimal patient outcomes [4]. It was based on the seven roles of a physician identified in the CanMEDS 2005 physician competency framework [5] and was endorsed by the European Union of Medical Specialists (UEMS).

Since that time:

- Radiotherapy technology and techniques have continued to develop and to be more widely adopted. New combinations of radiotherapy and systemic treatments (chemotherapy, immunotherapy and targeted therapies) have been introduced, with substantial survival gains.
- Survival rates for many cancers have improved increasing the importance of managing survivorship.
- The CanMEDS framework was revised by the Royal College of Physicians and Surgeons of Canada in 2015 [6]. The role of "Manager" was changed to "Leader" [7] and there were changes in all the roles emphasising the patient's perspective and patient safety.
- The CanMEDS 2015 framework contained the concept of Entrustable Professional Activities (EPAs), "A key task of a discipline that can be entrusted to an individual who possesses the appropriate level of competence" [6]. Trainers regularly make decisions as to which critical professional tasks they will allow a trainee to perform independently. Thus EPAs are at the boundary of training and medical duties allowing the concept of competences to be applied and assessed by linking them with professional activities [8].
- A Delphi survey by the Global Radiation Oncology Collaboration in Education (GRaCE) group defined a leader role curriculum for radiation oncology [9].
- The European Commission Expert Group on Cancer Control established a European Union Implementation Group tasked with exploring the training of clinical cancer specialists with particular emphasis on the interdisciplinary training of doctors in the clinical cancer specialties. They proposed competences in, radiation oncology, systemic therapy and surgical oncology that should be acquired by all cancer specialists regardless of discipline [10].

The decision was therefore made to revise the Core Curriculum.

Materials and methods

In 2017 all the European National Societies were invited to identify a representative with an interest in curriculum design. They were asked to share their national radiation oncology or clinical oncology curriculum with the group. The importance of engaging the stakeholder population including young specialists and trainees was identified. In October 2017 a face-to-face meeting was attended by representatives of 20 European National Societies, members of the ESTRO Education Committee, a senior radiation oncology educationalist from Canada, representatives of young ESTRO (yESTRO) including trainees, a Radiation Therapist (RTT) and two senior non-clinical members of ESTRO. Presentations were made on the national curricula in countries where clinicians practised solely radiation oncology, solely clinical oncology and the country with the lowest Gross Domestic Product (GDP). We divided into four groups, chaired by members of yESTRO and reviewed different sections of the curriculum, identifying the areas we thought required revision. A first draft was developed taking into account:

- the 3rd edition of the ESTRO Core Curriculum
- the influences discussed in the introduction
- comments of the groups in the workshop
- competences contained in the CanMEDS 2015 framework [6]
- advice from physicists
- advice from radiobiologists
- National Societies curricula
- statements on professionalism by the General Medical Council [11]

Multiple iterations were developed with the advice of all the groups mentioned previously including the representatives of 27 National Societies. This was achieved by sharing versions on email and a second face-to-face meeting at the ESTRO conference in 2018. This included the groups listed above and the UEMS radiotherapy section where the latest iteration was revised line by line.

Table 1
The Entrustable Professional Activities developed for the CANMEDS roles.

Role	Entrustable Professional Activities
Medical Expert	Develop a management plan for a patient with a cancer diagnosis Implement a treatment strategy Develop and implement a management plan for survivorship
Communicator	Communicate appropriately and effectively with patients and their relatives
Collaborator	Work effectively with other health care professionals to provide safe care and to optimise the quality of treatment
Leader	Discuss the context in which they work and apply the principles of change management including quality improvement methodology in this context Use resources appropriately Demonstrate the ability to work in, build and lead teams
Advocate	Advocates for cancer patients
Scholar	Plan personal learning experiences and use them to enhance patient care Educate others to enhance patient care Contribute to the knowledge base that underpins patient care
Professional	Demonstrate that the care of their patients is their first concern Manage their work life balance to maintain their own wellbeing

Table 2
Example of lay out of EPAs, competences and enabling competences - EPA: Communicate appropriately and effectively with patients and their relatives.

Competences	Enabling Competences
Build a therapeutic relationship with patients and their relatives	Know the theory underpinning communication skills
	Demonstrate empathy, respect and compassion
Elicit and synthesise accurate and relevant information from patients	Provide a clear structure for and manage the flow of the consultation
	Demonstrate active listening
	Communicate clearly with patients respecting their social, political, cultural, religious and sexual standpoint
	React to body language and verbal cues with relevant observations and questions

Table 3
Levels of Entrustable Professional Activities.

Level	Trust trainee
Level 1	Observation only
Level 2	Direct proactive supervision i.e., with a supervisor present in the same room
Level 3	Indirect reactive supervision i.e., the supervisor is easily available if necessary
Level 4	Without immediate supervision but with post hoc report or remote supervision
Level 5	Trainee supervises more junior trainees

A final draft was then reviewed by senior radiation oncology educationalists from Australia and Canada and the Medical Oncology section of the UEMS. This 4th edition of the ESTRO Core Curriculum was recommended to the National Societies in Milan in 2019 and has been endorsed by 29 National Radiation Oncology/Radiotherapy Societies to date.

The curriculum defines:

- the EPAs, competences and enabling competences that trainees need to develop to allow them to practice as independent specialists
- the characteristics of the Training Programmes that will enable them to develop these
- the level of proficiency they need to achieve
- the characteristics of assessment systems that will provide assurance that they have developed the competences to the required level.

Results

The 4th edition of the ESTRO Core Curriculum for Radiation Oncologists/Radiotherapists can be found at the ESTRO website [12]. It is based on the CanMEDS 2015 framework. It identifies fourteen EPAs covering all seven CanMEDS roles of a physician (Table 1). An example of the way in which EPAs, competences and enabling competences are organised is shown in Table 2. Other areas of major change include:

- competences related to the leadership role derived from the curriculum developed by the GRaCE Group [7]
- sufficient knowledge of surgical oncology and systemic therapies to participate in MDT discussions
- defining the levels of proficiency required for different tumour sites by the level of EPA (Table 3). The incidence of tumour types and organisation of Cancer Treatment Services vary across Europe. The levels of proficiency are therefore suggestions of ranges including the minimum levels of proficiency. The expectation is that these will be modified by National Societies to provide specific outcomes for their programmes.

Additional flexibility is built into the curriculum as:

- statements about competences can be regarded as EPAs or just headings
- the assessment section allows for exam-based assessments, work place based assessments alone or a combination of them both
- National Societies can express the level of competencies required to complete training as either the level of the EPA achieved or as a simple statement as to whether the level of competence required in a tumour site has been reached.

In view of the variation in the structure of training programmes across Europe, milestones, the expected ability of a trainee at a stage of his/her training, have not been specified.

Two areas of debate were the recommended length of training and competences in systemic therapy. The curriculum states that, "in general, the training period should be at least five years full-time or an equivalent period part-time," with at least 80% being spent in clinical work including education. It recommends, "that all radiation oncologists should have sufficient knowledge of systemic therapies to be able to take clinical responsibility for the integration of care of the cancer patient." The competences are based on knowledge of the role, side effects and interaction with radiotherapy of systemic therapies and the ability to diagnose and provide treatment for the side effects of systemic therapy either personally or by onward referral. These competences draw on the recommendations of the European Union Implementation Group [10].

Discussion and conclusions

The 4th edition of the curriculum, based on CanMEDS 2015, has built on the competency based format of the third edition with the introduction of the concept of EPAs. This has allowed the key roles of the discipline of Radiation Oncology/Radiotherapy to be identified and the level of proficiency required in assessments to be more clearly defined.

It is hoped that the inclusion of the leadership role will encourage trainees to develop these competences that are important if we are to continue to improve the care we offer patients. A leadership course designed jointly by members of ESTRO, the Canadian Association Of Radiation Oncology (CARO) and The Royal Australian and New Zealand College of Radiologists (RANZCR) and delivered by a multiprofessional group for radiation oncologists, physicists and RTTs is aimed at allowing us to move towards this goal.

The multiprofessional nature of the delivery of radiation treatment has been reflected in the group that developed this edition, including an RTT, a physicist, a radiobiologist and non-clinical administrators at ESTRO as well as National Societies' representatives and members of the ESTRO Education Committee. A survey of radiation oncology professionals under the age of forty years showed that the majority were unaware whether the European Core Curriculum had been implemented in their country [13] although a survey of National Societies by the UEMS showed it had been implemented by most European countries [14]. The involvement of trainees and recently qualified specialists may lead to increased awareness of this curriculum in addition to providing their valuable perspective in its development. It is hoped that the inclusive method of developing the 4th edition, with all stakeholders being encouraged to play an active role, has resulted in a

document that will have utility in the wide range of environments in which radiation oncology is practised in Europe.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.radonc.2019.08.013.

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