



## Original Article

## Clinical oncology module for the ESTRO core curriculum



Kim Benstead<sup>a,\*</sup>, Pedro C. Lara<sup>b,c</sup>, Yannick Eller<sup>d</sup>, Lotte Engell-Noerregaard<sup>e</sup>, Jesper G. Eriksen<sup>f</sup>, Papa Macoumba Gaye<sup>g</sup>, Jana Jaal<sup>h</sup>, Antonio Juretic<sup>i</sup>, Marju Kase<sup>j</sup>, Vassilis Kouloulas<sup>k</sup>, Elvira Kozma<sup>l</sup>, Magnus Lagerlund<sup>m</sup>, Graeme Lumsden<sup>n</sup>, Icro Meattini<sup>o</sup>, Ingvil Mjaaland<sup>p</sup>, Raphael Pfeffer<sup>q</sup>

<sup>a</sup> Gloucestershire Oncology Centre, Cheltenham General Hospital, UK; <sup>b</sup> Fernando Pessoa Canarias University, Spain; <sup>c</sup> Oncology Dept, San Roque University Hospital, Spain; <sup>d</sup> Dept of Medical Education, University of Dundee, UK; <sup>e</sup> Dept of Oncology, Herlev Hospital, University of Copenhagen, Denmark; <sup>f</sup> Experimental Clinical Oncology, Dept of Oncology, Research 2, Aarhus University Hospital, Entrance C, Level 1, Denmark; <sup>g</sup> Radiation Oncology, Radiation Oncology Dept, Dalal Jamm University Hospital, Senegal; <sup>h</sup> Dept of Radiotherapy and Oncological Therapy, Haematology and Oncology Clinic, Tartu University Hospital, Estonia; <sup>i</sup> Clinical Oncology, University Hospital "Sveti Duh" and School of Medicine, University of Zagreb, Croatia; <sup>j</sup> Oncology Center, East Tallinn Central Hospital, Estonia; <sup>k</sup> Radiation Oncology, National and Kapodistrian University of Athens, Medical School, Greece; <sup>l</sup> Radiotherapy Dept, Oncology Service, Mother Teresa University Hospital, Tirana, Albania; <sup>m</sup> Clinical Oncology, Oncology Dept, Kalmar County Hospital, Sweden; <sup>n</sup> Beatson West of Scotland Cancer Centre, Glasgow, UK; <sup>o</sup> Department of Experimental and Clinical Biomedical Sciences "M Serio", University of Florence Radiation Oncology Unit-Oncology Dept, Azienda Ospedaliero-Universitaria Careggi, Florence, Italy; <sup>p</sup> Dept of Oncology and Haematology, Stravanger University Hospital, Norway; <sup>q</sup> Assuta Medical Centres, Tel Aviv, Israel

## ARTICLE INFO

## Article history:

Received 2 October 2020

Received in revised form 19 November 2020

Accepted 21 November 2020

Available online 01 December 2020

## Keywords:

ESTRO  
Radiotherapy  
Radiation oncology  
Systemic anti-cancer therapy  
Chemotherapy  
Immunotherapy  
CanMEDS  
Specialist education and training  
Oncology education and training

## ABSTRACT

**Introduction:** Clinical oncologists are physicians with the competencies to manage cancer patients through the entire disease pathway combining the competencies of radiation and medical oncologists. The 4th edition of the European Society for Radiotherapy and Oncology Core Curriculum for Radiation Oncology/Radiotherapy (ESTRO curriculum) has received wide support by the clinical oncology community. The aim was to develop a clinical oncology module that could be combined with the ESTRO curriculum to enable clinical oncology trainees to follow a single curriculum.

**Materials and methods:** A range of stakeholders including National Society representatives, an oncologist from a low- middle-income country, and a recently appointed specialist, developed and commented on iterations of the curriculum. Further modifications were made by the ESTRO Education Council.

**Results:** The module is based on the CanMEDS 2015 framework and identifies 20 enabling competencies in the Medical Expert role that are required in addition to the ESTRO curriculum for the training of clinical oncologists. Recommendations are made for the levels of Entrustable Professional Activities (EPAs) to be attained by the end of training.

**Conclusions:** The Clinical Oncology module, when combined with the ESTRO curriculum, covers the entire cancer pathway rather than being modality specific. It is hoped it will aid in the development of comparable standards of training in clinical oncology across Europe and may also have utility in low- and middle-income countries as well as providing a single curriculum for trainees.

© 2020 Elsevier B.V. All rights reserved. Radiotherapy and Oncology 156 (2021) 19–22

The 4th edition of the European Society for Radiotherapy and Oncology Core Curriculum for Radiation Oncology/Radiotherapy (ESTRO Curriculum) describes the minimum competencies necessary to deliver ionising radiation therapy including when this forms part of combined modality treatments with systemic therapies [1]. It identifies that, "Radiotherapy (Radiation Oncology) is

\* Corresponding author at: Gloucestershire Oncology Centre, Cheltenham General Hospital, Sandford Rd., Cheltenham GL53 6AN, UK.

E-mail addresses: kbenstead@btinternet.com (K. Benstead), pedrocarlos.lara@ulgp.es (P.C. Lara), 2421684@dundee.ac.uk (Y. Eller), lotte.engell-noerregaard@regionh.dk (L. Engell-Noerregaard), jesper@oncology.au.dk (J.G. Eriksen), macoumba.gaye@ucac.edu.sn (P.M. Gaye), jana.jaal@klinikum.ee (J. Jaal), antonio.juretic@zg.t-com.hr (A. Juretic), Marju.Kase@itk.ee (M. Kase), vkouloul@ece.ntua.gr (V. Kouloulas), magnus.lagerlund@regionkalmar.se (M. Lagerlund), graeme.lumsden@nhs.net (G. Lumsden), icro.meattini@unifi.it (I. Meattini), ingvil.mjaaland@sus.no (I. Mjaaland), repphaelp@assuta.co.il (R. Pfeffer).

<https://doi.org/10.1016/j.radonc.2020.11.029>

0167-8140/© 2020 Elsevier B.V. All rights reserved.

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 disease. It may be practiced as an independent oncological specialty or may be integrated in the broader practice of clinical oncology," that combines radiation oncology with medical oncology. Clinical oncology has been defined as the practice of physicians with the competencies to, "Manage cancer patients with a wide variety of tumour types through the full disease pathway," with specialists "safely and effectively delivering and managing patients receiving standard systemic anti-cancer therapies in the curative, neo-adjuvant, adjuvant and palliative settings," [2] in addition to demonstrating the competencies related to radiation therapy described in the ESTRO Curriculum. Clinical oncologists contribute to research in systemic therapies as well as radiation therapy and new radiation technology

gies. They are able to prescribe both modalities either as sole modalities or as a combination of systemic and radiation therapy and are particularly skilled at treating side effects of these combination therapies. The specialty is therefore focused on supporting the patient through the whole of the cancer care pathway rather than being modality specific.

A questionnaire study sent to National Societies in Europe [3], which regulate education, found a wide variation in training and practice with countries training all non-surgical oncologists as clinical oncologists, training medical and clinical oncologists or training medical and radiation oncologists. The scope of the practice of radiation oncology also varied with many radiation oncologists prescribing systemic therapies given as a combined treatment with radiation treatment.

The ESTRO Curriculum has received wide support by the clinical oncology as well as the radiation oncology community. It has been endorsed by 29 National Societies and adopted as the European Training Requirement (ETR) for Radiation Oncology/Radiotherapy by the European Union of Medical Specialists [4]. A study examining barriers to implementation of the curriculum [5] found very high rates of agreement with the values and aims embodied in the curriculum and this was equally high in National Societies representing clinical oncologists as those representing radiation oncologists. It was therefore thought to be more appropriate to develop a clinical oncology module that could be combined with the ESTRO Curriculum than to develop a separate curriculum or to adopt a medical oncology curriculum such as the ETR for the Specialty of Medical Oncology [6] or the ESMO/ASCO Recommendation for a Global Curriculum in Medical Oncology [7]. The module will enable trainees to follow a single curriculum.

## Methods

A meeting of representatives of National Societies whose members practice clinical oncology and radiation oncologists, who regularly prescribe systemic therapy as part of combined therapy with radiation treatment, was held to discuss the value and feasibility of developing a clinical oncology curriculum. The group included a recently qualified specialist. The International Atomic Energy Authority (IAEA) is consulting with radiation oncologists from all their member states to determine the relevance and feasibility of implementing the ESTRO Curriculum. Clinical oncology, integrating the practice of radiation oncology and medical oncology, is widely practiced in countries in Africa and it is thought it would be valuable for these countries to have the possibility of moving towards training programmes that are based on an international curriculum. An oncologist from Senegal was therefore invited to be a member of the group to advise on the utility and feasibility of the clinical oncology curriculum for low- and middle-income countries during the development stage. The Clinical Oncology Module was then developed with multiple iterations via email with all suggested changes being discussed with the whole group. Further planned face to face meetings were curtailed by the covid situation. It was then discussed with and modified by the ESTRO Education Council and shared with the National Societies. The group developed recommendations on the length of training; organisation of the training programme; Entrustable Professional Activities (EPAs) additional to the ESTRO Curriculum, the proficiency to be reached and assessment.

## Results

The recommendations for the basic science section of the ESTRO curriculum include the knowledge required for the practice of systemic anti-cancer therapy (SACT) as well as radiation therapy. The

ESTRO curriculum is based on the CANMeds 2015 framework [8] which includes the concept of EPAs, "A key task of a discipline that can be entrusted to an individual who possesses the appropriate level of competence." The EPAs, competencies and enabling competencies in six of the seven domains: leader, health advocate, scholar, professional, communicator and collaborator are thought to be appropriate and sufficient for the training of clinical oncologists. The EPAs and competencies in the medical expert role were also thought to be appropriate and sufficient. The group therefore concentrated on developing the additional enabling competencies in the medical expert role required for the safe and effective practice of clinical oncology. Twenty enabling competences were identified. The statements regarding the level of proficiency to be demonstrated by trainees at the completion of their training is expressed in the ESTRO Curriculum as the level of the EPAs that trainees are expected to achieve in relation to each tumour site. This includes the management of the primary tumour and metastases arising from it. The ESTRO Curriculum states that clinical oncology trainees will demonstrate competencies in systemic as well as radiation therapy. We propose that in general the same level of EPAs should be recommended for SACT as for radiation competencies. We have therefore only made statements about expected EPA levels for tumour sites that are not treated by radiation oncologists. The definitions of the EPA levels are contained within the ESTRO curriculum.

The clinical oncology module below is designed to be read in conjunction with the ESTRO curriculum.

Clinical oncologists are defined as physicians with the competencies to manage cancer patients with a wide variety of tumour types through the full disease pathway combining the competencies of radiation and medical oncologists. Clinical oncologists safely and effectively deliver and manage patients receiving systemic anti-cancer therapies as well as treatments with ionising radiation in the curative, neo-adjuvant, adjuvant and palliative settings, either as sole modalities or in combination. Clinical oncologists take part in research using new systemic therapies. They also possess the competencies to focus on symptom control, supportive care and palliative medicine, when neither modality is appropriate.

The objective of the training programme is to educate and train physicians in the specialty of clinical oncology to the level of competency allowing them to practice as an independent specialist.

The training period should be sufficient to obtain the competencies to become an independent specialist. In general, the training programme should be at least five years full time or an equivalent period part-time. At least 80% of the programme should be spent in clinical work including time in education.

The components of training in addition to those in the ESTRO Core Curriculum for Radiation Oncology/Radiotherapy are as follows:

Organisational aspects of patient care and practical teaching vary widely between European institutions. In some institutions trainees will gain experience of managing patients receiving radiation treatment and patients receiving SACT at the same time while others will gain the experience in separate modules.

The Programme Director must be a highly qualified clinical oncologist or radiation oncologist with experience of administering concurrent SACT with radiation treatment. He or she should have considerable experience in trainee education and in organisational activities.

Adequate staffing levels in clinical oncology departments are essential for training. Several clinical oncologists with responsibility for training should be appointed. These teaching staff members need to devote dedicated professional time to the teaching programme. It is recommended that the number of trainees does not exceed the number of full time equivalent staff clinical oncologists. Sufficient supervision of the trainees should be guaranteed.

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

Member of the teaching staff should schedule regular practical teaching sessions with the trainees. There should be continuous feed-back to the trainees about their management of patients including their competencies in planning of radiation treatments and SACT. A minimum of one and preferably several practical training sessions between the teacher and the trainee should be scheduled per week to enable the trainee to reach the required levels for the EPAs.

The Clinical Oncology Curriculum includes all the EPAs, competencies and enabling competencies of the ESTRO Curriculum. Table 1 lists the additional enabling competencies required for the safe and effective practice of clinical oncology. Thus, for example, contributing effectively to discussions at the tumour board includes SACT enabling competencies in the ESTRO Curriculum and they are not restated here.

The required proficiency in treating cancer at different sites is in line with the ESTRO Curriculum. The levels of the EPAs required for SACT, or radiation therapy combined with SACT are the same as

those required for radiation competencies for each sites. In the management of patients with lymphomas clinical oncologists will be expected to demonstrate competencies in radiation therapy but may not possess competencies related to SACT. The level of EPAs required for cancers treated with SACT but not radiation therapy are listed in Table 2.

Assessment should be as recommended in the ESTRO Curriculum. It is important that workplace based assessments include direct observation of interactions with patients receiving SACT.

### Discussion

A broad stakeholder group drawn from National Societies, an oncologist from a low- middle-income group country and a recently qualified specialist developed a Clinical Oncology Module. It contains twenty enabling competencies in the medical expert domain as an addition to the ESTRO Curriculum. Together they cover the entire cancer patient pathway rather than being modality specific. The module does not define how the training to achieve these competencies should be delivered but does make recommendations about training programmes and the level of EPAs that

**Table 1**  
The enabling competences in addition to those listed in the ESTRO Core Curriculum required for the safe and effective practice of Clinical Oncology.

Medical expert	
<ol style="list-style-type: none"> <li>1) Develop a management plan for patients with a cancer diagnosis</li> <li>2) Implement a treatment strategy</li> <li>3) Develop and implement a management plan for survivorship</li> </ol>	
Undertake the initial outpatient consultation	<ul style="list-style-type: none"> <li>Select the most appropriate SACT regimen according to national and international guidelines and associated supportive measures</li> <li>Recognise if there is an appropriate research trial and discuss this with the patient and their carers</li> <li>Design a management plan in situations of uncertainty</li> <li>Modify approach to address the specific needs of individual patients taking into account their beliefs, wishes, pregnancy, comorbidities, frailty and age</li> <li>Discuss a SACT treatment strategy including:                             <ul style="list-style-type: none"> <li>Goals of treatment</li> <li>Benefits and risks</li> <li>Pre-treatment procedures such as appropriate investigations, insertion of a long line</li> <li>Number and timing of cycles of treatment</li> <li>Plan for assessing response</li> <li>Acute toxicities and supportive measures</li> <li>Late toxicities</li> </ul> </li> <li>Obtain a valid consent from the patient</li> <li>Diagnose oncological emergencies including:                             <ul style="list-style-type: none"> <li>Spinal cord compression</li> <li>SVC obstruction</li> <li>Neutropenic sepsis</li> <li>Autoimmune reactions in patients receiving immunotherapy</li> <li>Thromboembolic disease</li> <li>Metabolic abnormalities such as hypercalcaemia, hyponatraemia and hyperkalaemia</li> <li>Major organ failure</li> <li>Reduced levels of consciousness</li> </ul> </li> <li>Manage them effectively and recognise when referral to another specialty or the Intensive Care Unit is indicated</li> </ul>
Implement the treatment strategy	<ul style="list-style-type: none"> <li>Coordinate the appropriate investigations, procedures and appointments effectively</li> <li>Generate a SACT prescription that is safe and accurate</li> <li>Assess toxicity of treatment at each appointment and modify treatment appropriately</li> <li>Provide appropriate supportive therapies for toxicities</li> <li>Manage patients receiving combined treatments including radiotherapy and SACT</li> <li>Coordinate appropriate investigations to assess response to treatment and toxicities of treatment</li> <li>Evaluate response to treatment using RECIST, iRECIST and other commonly used criteria for formally evaluating response</li> <li>Discuss the results of the investigations clearly and empathetically with the patient and their carers</li> <li>Organise follow up of patient including management of late toxicities either personally or in collaboration with colleagues</li> <li>Communicate clearly and in a timely manner with colleagues</li> </ul>
Manage patients with relapsed or progressing disease	<ul style="list-style-type: none"> <li>Explain the options if the cancer has relapsed or is progressing, eliciting the patient's wishes and explaining clearly the benefits and risks</li> <li>Identify when further SACT will not be beneficial to the patient and communicate this clearly and empathetically to the patient and their carers</li> <li>Design and implement a management plan to improve symptoms and provide support in the end of life setting including collaboration with appropriate colleagues</li> </ul>

**Table 2**

The level of Entrustable Professional Activities required for cancers treated with systemic anti-cancer therapy but not radiotherapy.

Level	Site	Subsite or Subtype
4-5	Lower gastrointestinal	Colon adenocarcinoma
4-5	Ovary	Epithelial cancer
2-5	Testis/Ovary/Other sites	Germ Cell Tumours
2-5	Gastrointestinal	GIST
2-5	Hepatobiliary	Hepatocellular carcinoma
2-5	Lung/Gastrointestinal/Other sites	Neuroendocrine carcinoma
1-3	Hepatobiliary	Cholangiocarcinoma
1-2	Ovary	Sex cord stromal tumours
1-2	Placenta	Gestational trophoblastic neoplasia

Footnote: 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.

should be achieved for tumour sites. It is hoped this will benefit National Societies by establishing comparable standards of training in clinical oncology across Europe and trainees by providing a single curriculum for clinical oncology while maintaining sufficient flexibility for the delivery of training to be optimised for the context of individual programmes. It may also benefit low- and middle-income countries by providing an international clinical

oncology curriculum based on the ESTRO Curriculum that has been adopted by the IAEA.

**Conflict of interest statement**

There are no conflicts of interests for any of the authors.

**References**

- [1] Benstead K, Lara PC, Andreopoulos D, et al. Recommended ESTRO Core Curriculum for Radiation Oncology/Radiotherapy 4th edition. *Radiother Oncol* 2019;141:1–4. <https://doi.org/10.1016/j.radonc.2019.08.013>.
- [2] [https://www.rcr.ac.uk/sites/default/files/documents/clinical\\_oncology\\_curriculum\\_purpose\\_statement.pdf](https://www.rcr.ac.uk/sites/default/files/documents/clinical_oncology_curriculum_purpose_statement.pdf) [accessed 1st October 2020].
- [3] Benstead K, Turhal NS, O'Higgins N, et al. Multidisciplinary training of cancer specialists in Europe. *Eur J Cancer* 2017;83:1–8. <https://doi.org/10.1016/j.ejca.2017.05.043>.
- [4] [https://www.uems.eu/\\_\\_data/assets/pdf\\_file/0008/111797/UEMS-2019.46-European-Training-Requirements-in-Radiation-Oncology-Radiotherapy.pdf](https://www.uems.eu/__data/assets/pdf_file/0008/111797/UEMS-2019.46-European-Training-Requirements-in-Radiation-Oncology-Radiotherapy.pdf) [accessed 1st October 2020].
- [5] Giuliani M, Martimianakis MA, Benstead K, et al. Exploring implementation of the ESTRO Core Curriculum at the national level. *Radiother Oncol* 2020;147:118–22. <https://doi.org/10.1016/j.radonc.2020.03.028>.
- [6] [https://www.uems.eu/\\_\\_data/assets/pdf\\_file/0017/52514/2017.32-UEMS-European-Training-Requirements-Medical-Oncology-.pdf](https://www.uems.eu/__data/assets/pdf_file/0017/52514/2017.32-UEMS-European-Training-Requirements-Medical-Oncology-.pdf) {accessed 1st October 2020}.
- [7] Dittrich C, Kosty M, Jezdic S, et al. ESMO/ASCO recommendations for a Global Curriculum in Medical Oncology edition 2016. *ESMO Open* 2016;1(5):. <https://doi.org/10.1136/esmoopen-2016-000097>.
- [8] Frank JR, Snell L, Sherbino J, editors. *CanMEDS 2015 Physician Competency Framework*. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.