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## Review

# Undergraduate cancer education in Spain: The debate, the opportunities and the initiatives of the University Forum of the Spanish Society of Radiation Oncology (SEOR)



Pedro Lara<sup>a</sup>, Felipe A. Calvo<sup>b</sup>, Ferran Guedea<sup>c,\*</sup>,  
Pedro Bilbao<sup>d</sup>, Alberto Biete<sup>c</sup>

<sup>a</sup> Universidad de Las Palmas, Canary Islands, Spain

<sup>b</sup> Universidad Complutense, Madrid, Spain

<sup>c</sup> Universidad de Barcelona, Barcelona, Spain

<sup>d</sup> Universidad del País Vasco, Bilbao, Spain

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## ABSTRACT

Most medical schools in Spain (80%) offer undergraduate training in oncology. This education is highly variable in terms of content (theory and practical training), number of credits, and the medical specialty and departmental affiliation of the professors. Much of this variability is due to university traditions in the configuration of credits and programmes, and also to the structure of the hospital-based practical training. Undergraduate medical students deserve a more coherent and modern approach to education with a strong emphasis on clinical practice. Oncology is an interdisciplinary science that requires the input of professors from multiple specialties to provide the primary body of knowledge and skills needed to obtain both a theoretical and clinical understanding of cancer. Clinical skills should be a key focus due to their importance in the current model of integrated medical management and care.

Clinical radiation oncology is a traditional and comprehensive hospital-based platform for undergraduate education in oncology. In Spain, a significant number ( $n=80$ ) of radiation oncology specialists have a contractual relationship to teach university courses. Most Spanish universities (80%) have a radiation oncologist on staff, some of whom are department chairs and many others are full professors who have been hired and promoted under competitive conditions of evaluation as established by the National Agency for Quality Evaluation.

The Spanish Society of Radiation Oncology (SEOR) has identified new opportunities to improve undergraduate education in oncology. In this article, we discuss proposals related

\* Corresponding author at: Department of Radiation Oncology, Catalan Institute of Oncology, University of Barcelona, Barcelona, Spain. Tel.: +34 93 260 77 20; fax: +34 93 260 77 25.

E-mail addresses: [guedea@iconcologia.net](mailto:guedea@iconcologia.net), [ferran.guedea@usphospitales.com](mailto:ferran.guedea@usphospitales.com) (F. Guedea).

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to theoretical (20 items) and practical clinical training (9 items). We also describe the SEOR University Forum, which is an initiative to develop a strategic plan to implement and organize cancer education at the undergraduate level in an interdisciplinary teaching spirit and with a strong contribution from radiation oncologists.

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## 1. Introduction

Cancer is one of the main causes of mortality and morbidity in Spain. The large burden that cancer places on society has led to the development of supranational policies from organizations such as the World Health Organization (WHO) and the European Union (UE), among others. In Spain, both the national and regional governments are involved in policy-making in this area.

In the fight against cancer, the importance of training physicians in cancer care is obvious. The likelihood of patient survival depends, in large measure, on the knowledge of the physician who first evaluates the patient. For this reason, it is essential that physicians be aware of early detection programmes and know to refer the patient to the appropriate specialist. In most cases, it is the primary care physician (PCP) who performs this first consultation. Moreover, it is the PCP who will be responsible for a significant part of the follow up of these patients once treatment has been completed.

The WHO and the Collaborating Centre for Cancer Education (CCCE) have stressed the importance of providing medical students with a well-designed cancer education programme (<http://www.rug.nl/umcg/education/whocce>). The aim of medical education should be to produce graduates with an adequate practical understanding of tumour biology and pathology, epidemiology, prevention, early diagnosis, treatment, follow up, and rehabilitation to carry out their future professional work. This is especially important in the area of primary care.

In the words of the WHO-CCCE “As to the opinion of the WHO-CCCE, it is of deep concern that in undergraduate cancer education the emphasis is frequently still on detailed specialist cancer knowledge instead of on topics that are relevant in general practice for all health care professionals. Especially in undergraduate cancer education it should be realized that we need our precious teaching hours for issues relevant for general practice”.

Although in Spain cancer education is highly heterogeneous, implementation of the “Bologna model” has resulted in curricular changes in medical studies, including the obligation to incorporate cancer education into the curriculum.

To provide medical school graduates with adequate professional skills in oncology, and to improve undergraduate education in this area by establishing uniform standards for all schools of medicine, the Spanish Society of Radiation Oncology (SEOR) has created a University Forum. The University Forum has been created to provide a vehicle to channel innovations in education through the institutional participation of SEOR members who teach at Spanish universities.

In Spain, numerous universities already have specialists in Radiation Oncology who teach both undergraduate and

graduate-level courses. The experience of universities such as the *Complutense University of Madrid*, and the Universities of Barcelona, Navarra and the Basque Country, among others, demonstrate the important educational contributions of oncologists, as well as the extensive collaboration between physicians who specialize in oncology.<sup>1</sup> Many radiation oncologists work as university professors in various capacities, including full professors ( $n=8$ ), associate professors ( $n=10$ ), and assistant professors ( $n=54$ ). The widespread participation of these specialists in as university professors assures expert involvement in undergraduate cancer education.

## 2. The debate on undergraduate education in Oncology. Why and for what purpose?

The various aspects of this debate are summarized below in Sections 2.1–2.3.

### 2.1. Do undergraduate students need to study Oncology?

#### 2.1.1. Cancer is a common and serious illness

Moreover, diagnosis, treatment, and follow up of this disease are expensive and labour-intensive. As has been reported elsewhere “Cancer is one of the main causes of mortality and morbidity in Spain, as in other developed societies. Cancer in Spain is the second leading cause of death,<sup>2</sup> the first cause of years of potential life lost (YPLL), and one of the main motives for hospital consultations. In the hospitals that form part of the National Healthcare system, cancer accounts for 9.5% of discharges and 12.9% of hospitalizations, with a mean stay of 9.9 days.<sup>3</sup>

According to the National Healthcare Survey, 1.24% of the population over age 15 reported having a malignant tumour.<sup>4,5</sup> Cancer is closely associated with age—75% of cancer deaths occur in people over age 65—and with sex, with cancer mortality rate of 286 per 100,000 men and 172 for women. However, the incidence of cancer as a cause of YPLL is 10 points higher in women than men, accounting for nearly half (46%) of YPLL in women.<sup>5</sup>

#### 2.1.2. Cancer education could affect patient survival

The most important indicator of the efficacy of a health care system in the fight against cancer is the patient survival rate, defined as the percentage of patients that survive for a specific time period. This indicator reflects the degree to which cases are diagnosed in a curable stage. It also indicates the efficacy of the therapeutic procedures.<sup>6–10</sup>

In order to improve the care of cancer patients, the cancer control strategy of the National Health Service calls for,

among other measures, improvements in patient access to health care resources and the development of criteria and rapid access to diagnostic resources when there is a well-founded clinical suspicion of cancer.<sup>11,12</sup> In some Autonomous Regions in Spain, implementation of similar measures has already proven the efficacy of these types of programs.<sup>13</sup> For these reasons, it is essential that we provide a strong foundation in cancer education for medical students. The probability that a patient will survive a diagnosis of cancer is highly dependent on the cancer training of the physician who performs the initial consultation. In 90% of cases, the attending physician is the PCP. This same physician is likely to also be responsible for most follow up of these patients once they have been treated.

## 2.2. What do international organizations believe that a PCP should know about cancer?

We agree with what has been previously written elsewhere<sup>6</sup> "The WHO,<sup>14-19</sup> the European Parliament<sup>20</sup> and the EU,<sup>21,22</sup> as well as governments in other developed western countries<sup>23-26</sup> have tried to develop global strategies in the fight against cancer".

In 1981, the WHO and the Union of International Cancer Control (UICC) highlighted the importance of undergraduate cancer education in the fight against cancer.<sup>27</sup> The most notable recommendations of this meeting were the following:

1. The aim of undergraduate education in cancer should be to produce graduates with sufficient practical knowledge of tumour biology and pathology, epidemiology, prevention, early diagnosis, methods of treatment, and follow-up and rehabilitation to prepare them for future medical practice, especially at the primary health care level.
2. All medical schools should review their educational objectives on the basis of task analysis of physicians practising at the level of primary health care and of scientific developments in relation to knowledge, skills, and attitudes.
3. Cancer institutes (Radiotherapy and Medical Oncology) and universities should cooperate in the cancer education of undergraduates; this applies particularly to the cancer institutes where patients are managed. Two main policies should be considered: direct training of the students within the institutes, and participation of specialists of the institute in education in the medical schools.
4. A specifically-designated part of the curriculum should be devoted to oncology.
5. Coordinated teaching in cancer should be given during the final years of the curriculum with the purpose of providing senior students with a minimum standard of oncological knowledge.
6. Deans and other leaders of medical schools who have the responsibility of university programmes should be actively encouraged to accept the idea of coordinating the oncological information students receive, which is at present (1981) scattered over different disciplines.

The European Commission (EC) developed an action plan, "Action against cancer: European Partnership", which was approved by the EU parliament. In that plan, cancer

education of health care personnel was considered a priority.<sup>20</sup> To respond to this call to action, the EC and the European Organization for Research on Treatment of Cancer (EORTC) organized a joint meeting/workshop in Bonn, Germany.<sup>28,29</sup> After much debate, the group issued the following recommendations about cancer education:

- Multidisciplinary coordination of teaching.
- Academic presence of a Professor of Oncology.
- Specific testing to evaluate cancer knowledge.
- Clinical-based education.
- Emphasis on a multidisciplinary approach to care for cancer patients.

These proposals were made in the context of the deficiencies in cancer education in European medical schools and the need to assure that new physicians have adequate skills and knowledge about cancer prevention, early diagnosis, and palliative care and treatment.<sup>30</sup> These recommendations formed the basis for a proposal to develop common cancer education standards for all medical students in Europe.<sup>31</sup> Related initiatives include those put forth by the WHO-CCCE (<http://www.rug.nl/umcg/education/whocce>) and the work of the European School of Oncology.<sup>32,33</sup> Similarly, in EU countries that have a national health system, such as the United Kingdom<sup>34</sup> and Sweden,<sup>35</sup> the need to provide adequate cancer training to medical school students has been noted.

The EC has developed a series of recommendations for undergraduate and postgraduate cancer training for health care professionals. The recommendations for undergraduate training of physicians are the following<sup>36</sup>:

- 1 The training of doctors in cancer should be vigorously advanced by both teaching and research in the subject.
- 2 Each medical school should have an undergraduate teaching programme in cancer. Coordination of this programme is of critical importance, and should be implemented.
- 3 The vital role of the general practitioner both in the prevention and early diagnosis of cancer should be recognized and developed in all possible ways.
- 4 General practitioners should receive specific training in those aspects of the care of cancer patients particularly relevant to general practice, such as screening methods, counselling, appropriate methods of treatment, rehabilitation and terminal care.
- 5 Trainees in all relevant disciplines should receive appropriate teaching in the biology of neoplastic disease and in the scientific and clinical basis of treatment.
- 6 In those countries where oncologists are recognized, agreement should be reached on minimal objectives and requirements for the training of such specialists.
- 7 The principles of epidemiology should be taught at all levels of training.
- 8 All postgraduate trainees should have opportunities for gaining experience in both basic and clinical research.
- 9 The importance of inter-disciplinary cooperation in the care of patients with cancer should be recognized and encouraged in all relevant disciplines.

- 10 Efforts should be made to coordinate the activities of cancer institutes, specialist and scientific societies, universities and all types of hospital both in regard to clinical training and cancer research.
- 11 Modern teaching techniques should be used whenever appropriate at all levels of training.
- 12 More advantage should be taken of existing opportunities for promoting the interchange within the European Community of teachers, undergraduate students, postgraduate students and research workers.
- 13 All those responsible for planning programmes of continuing medical education should ensure that the subject of oncology receives appropriate emphasis. Particular attention should be given to the needs of doctors who, by nature of their isolated practice, do not have easy access to institutions providing continuing education programmes.

### 2.3. Cancer education in Spain

In Spain, as in the rest of the EU, undergraduate training programmes are being updated to meet the requirements of the European Higher Education Area (Bologna, 1999).<sup>37</sup> One of the driving forces behind the creation of the European Higher Education Area is to facilitate the free movement of professionals.<sup>38</sup> This change offers the opportunity to improve undergraduate cancer education in accordance with EC recommendations.

In 2005, the National Agency for Quality Assessment and Accreditation of Spain (ANECA) published a report called "The White Book of the Degree in Medicine".<sup>39</sup> The White Book recommended, as part of the obligatory contents in the course on Human Pathology, the acquisition of the professional skills and knowledge shown in Table 1.

Spanish Law ECI/332/2008, of 13 February (2008) establishes the requisites to obtain an official university diploma that confers the right of medical school graduates to practice medicine. This law clearly states that future physicians must acquire, through clinical training in humans, the capacity: "To understand cancer, including its diagnosis and management".

### 3. Opportunities in cancer education of undergraduate medical students in Spain

Very little information is available about cancer education in Europe, with the notable exception of the UICC, whose Accreditation Unit at the University of Groningen <http://www.rug.nl/umcg/education/whoccce>, has been publishing—for many years now—recommendations to help guide the development and implementation of cancer education plans. As we have written several times in this document, the WHO-CCCE at the University de Groningen is the source on which most documents on cancer education are based. However, the WHO-CCCE guidelines are general, and do not specify which specialists should teach the courses.

There are large differences between European countries in terms of undergraduate education in oncology. It is important to keep in mind that undergraduate cancer education makes no distinction between Radiation Oncology and Medical Oncology, which are postgraduate specialties. Similarly,

another important fact is that the specialty of Medical Oncology is not recognized in all EU countries.<sup>40,41</sup>

The efforts made by the Spanish Society of Medical Oncology (SEOM) to expand awareness of the educational situation Spain deserve to be acknowledged. In the second quarter of 2012, the SEOM carried out an email survey<sup>1,6</sup> to assess the current status of undergraduate training for Medical Oncology. However, leaving aside questions about the methodology and sample size, it seems probable that the limited focus of this survey—which addressed only the teaching of one specialty, Medical Oncology—may provide only a partial picture of the complexity of cancer care in Spain. Indeed, this limited focus may explain why the authors did not evaluate the many public and private universities (more than 50) in which Oncology is taught by tenured or associated professors who specialize in Radiation Oncology. Practically all universities in Spain have a radiation oncologist on staff as a professor (either in Radiology or Medicine). The large number of full professors in the most important universities of our country, as well as associate and assistant professors, show the efforts that Radiation Oncologists have put into teaching.

We share—and how could we not?—the need described in the ANECA White Book to create a specific and obligatory course on cancer, which could be independent or associated with other courses. The ultimate aim of our existence as professors is to improve the education of our students, and for this reason collaboration and teamwork between the various cancer specialties is important. The collaborative approach will make it easier to rapidly increase the number of cancer education programmes and, thereby, to establish cancer education throughout the country.

### 4. Initiatives of the Spanish Society of Radiation Oncology

Cancer is, without doubt, among the most important problems facing the Spanish health care system at this moment. Unfortunately, cancer education is notably inhomogeneous, and there is also a lack of teaching resources to train future physicians in oncology.<sup>42</sup> We are far from meeting the recommendations of international bodies in terms of education contents, and in providing the skills and knowledge that students must have. Implementation of the "Bologna model" has allowed us to establish some bases (White Book of ANECA) for a student-centred teaching approach in which collaborative education, which integrates specialists from different areas of knowledge, is an educational priority. We believe, therefore, that cancer education should be focus on fundamental principles, and not on specialized knowledge. An education that is focused on the student, through collaboration among professors, would minimize the drawbacks of outdated and static teaching that is centred in the professor.

Many Spanish universities ( $n=35$ ) now successfully offer cancer education using an integrative approach with a team of cancer specialists (usually either Radiation or Medical Oncologists). Moreover, these professionals also coordinate openly with professors of related subject areas (i.e., those who diagnose or treat cancer in its multiple presentations), and we consider this approach to be both essential and desirable.

**Table 1 – White book of ANECA. Recommendations.**

| Know  |   |  |
|---|---|--|
| Recognize, diagnose, and manage   |   | Be familiar with...  |
| <ol style="list-style-type: none"> <li>1. Cancer: Clinical characteristics and Staging</li> <li>2. Acute tumour complications: superior vena cava syndrome. Spinal chord compression syndrome. Endocranial hypertension syndrome. Hypercalcemia.</li> <li>3. Paraneoplastic syndromes (endocrinal, neurological, haematological, dermatological, and osteoarticular manifestations).</li> <li>4. General principles of cancer treatment</li> <li>5. Assessment of treatment response and effects on quality of life (e.g. RECIST, WHO)</li> <li>6. Acute toxicity of anticancer treatments</li> <li>7. Supportive care of cancer patients</li> <li>8. Risk factors that predispose to development of most common tumour types</li> <li>9. Primary and secondary prevention</li> <li>10. Lung cancer</li> <li>11. Breast cancer</li> <li>12. Gastric cancer</li> <li>13. Colorectal cancer</li> <li>14. Ovarian cancer</li> <li>15. Head and neck cancer</li> <li>16. Prostate cancer</li> <li>17. Bladder cancer</li> <li>18. Testicular cancer</li> <li>19. Cervix cancer</li> </ol> | <ol style="list-style-type: none"> <li>1. Carcinogenesis</li> <li>2. Mechanism of tumour invasion and metastasis</li> </ol> |  |
| Know how to do  |   |  |
| Perform competently (routinely and without supervision)   | Experience performing under guidance of a tutor   | Observation only of an expert performing   |
| <ol style="list-style-type: none"> <li>1. Take a medical history focused on cancer pathology</li> <li>2. Recognize on a physical examination tumours...</li> <li>3. Indicate and interpret tumour markers</li> <li>4. Indicate procedures for early detection</li> </ol>  | <ol style="list-style-type: none"> <li>1. General management of cancer syndromes</li> </ol>                                 | <ol style="list-style-type: none"> <li>1. Fine-needle aspiration of tumours</li> <li>2. Interventional radiological procedures in supportive care of cancer patients.</li> </ol> |

We believe that specialists in Palliative Care are best-equipped to provide quality undergraduate education in palliative medicine. Indeed, these specialists are already teaching courses in palliative medicine—whose contents are well-described in the ANECA White Book—at many Spanish universities.

In order to assure that medical school graduates have adequate professional skills in oncology, and in order to improve undergraduate education in this subject by establishing uniform standards for all Spanish medical schools, the SEOR has created the “University Forum”, which has the following premises:

(a) Vision

Many SEOR members teach and have contractual relationships in Spanish universities. Promotion of the field of Radiation Oncology in the university complements the

social, professional and academic profile of SEOR as a scientific society.

(b) Mission

To facilitate interaction between university professors who are members of the SEOR to share and disseminate their educational and research initiatives.

(c) Objectives

1. Create a space for independent evaluation of university activities.
2. Encourage academic promotion, in the university context, of SEOR members who request it.
3. Support the educational activities of the SEOR School of Radiation Oncology
4. Harmonize university activities with current international and European trends in higher education.
5. Reinforce the institutional relations of SEOR with university and educational authorities.

(d) Organization

1. Participants: invite SEOR members who are university professors (by default, those who have a contractual relationship) to formally join the UNIVERSITY FORUM.
  2. Leadership: generate a basic management structure that includes a Director, Coordinator and a Secretary.
  3. Contents: plan evaluation of university activities that have been proposed by SEOR members in the University Forum to further the interests of the SEOR.
- (e) Activities
1. Annual meeting (should coincide with the SEOR congress).
  2. University News in the SEOR Newsletter.
  3. Individual advice on achieving university promotion.
  4. Registry of university promotion of SEOR members.
  5. Follow up of PhD thesis defense.
  6. Follow up on research activity related to the university (grants and projects from Institutes of Health Care Research).
  7. Follow up, evaluation and proposals about the relationship between curricula and innovative educational projects.

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## 5. Work criteria of the SEOR University Forum

The following tasks need to be performed immediately:

1. Define a specific curriculum for Oncology education. This curriculum must not include any specialized postgraduate knowledge not useful to undergraduate students. The proposed programme emphasises general aspects over more specific aspects ones, with the goal of providing undergraduate education that is truly useful.
2. Oncology should be an obligatory course, with teaching load of 6 ECTS credits, distributed in a theory to practice ratio of 1:1.5. The theoretical cancer education should be given in the 5th or 6th year of the degree programme. The obligatory practical training sessions should be undertaken in oncology departments (Radiotherapy and/or Medical Oncology). Teaching in Palliative Care must be done by specialists in Palliative Medicine, many of whom are already involved in teaching at most Spanish universities. This is described in the ANECA WHITE BOOK on page 466, which describes the knowledge and skills that undergraduate students must acquire in this subject.
3. Cancer education should be taught by specialists in oncology. In Spain, two oncological specialities—Radiation Oncology and Medical Oncology—already share university teaching duties. All physicians on staff in Radiation and Medical Oncology departments, at both public hospitals and private hospitals with National Health Service contracts, should be accredited to teach so that they can supervise the practical training of medical students. Similarly, specialists with a specific profile who perform clinical work in oncology should be promoted to professor.

In addition, a database will be developed and continually updated to broaden knowledge about the university activities of SEOR members:

- (a) Registry of professors of Oncology, their university affiliation and department (including type of contractual relationship).
- (b) Description of PhD dissertations (TESEO database) of SEOR members.
- (c) Description of the curricula, contents, and teaching activities, by university and professor.

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## 6. Proposed SEOR cancer education programme

This course is conceived as a multidisciplinary course that, following the recommendations of the EU and the cancer education programmes in the United States, will provide students with an in-depth understanding of the general aspects of cancer, including molecular biology, carcinogenesis, prevention, diagnosis, as well as general knowledge of cancer treatments, support, and quality of life. Detailed information about the most common tumours affecting human beings will be provided only in certain cases. The application of general concepts to particular cases should contain a practical and well-reasoned approach to the management of specific clinical situations in cancer patients (Table 2).

### 6.1. Contents

In our opinion, the concepts taught in this course should not overlap those that are already included in other obligatory courses. The content is should thus be geared to providing complementary information about areas that are not sufficiently addressed in a general programme, but which should be addressed in greater depth to assure adequate training of students of general medicine. The course is divided into two parts.

Contents taught in the GENERAL part of this course include tumour biology, carcinogenesis and cancer prevention. In addition, students learn to check for tumour dissemination and the basic principles of cancer treatment.

The SPECIAL part of the course addresses aspects related to basic clinical practice in terms of diagnostic methodology, tumours of unknown origin, and supportive care of the cancer patient. Aspects relevant to each tumour location will be discussed if clinically important or because the therapeutic approach is novel. We will activate students previously acquired general knowledge of each tumour type to explore in greater depth the most relevant aspects of its diagnostic and therapeutic management. In this sense, teaching of the special part of the course will be done interactively with the students, who will contribute by sharing their knowledge of the topic gained in other university courses. In this way, this course is adaptable to the criteria of each university and, especially, to changes in our subject. This is particularly important given that more and more tumours are amenable to medical treatment, and in practically all tumours, the treatment approach is multidisciplinary.

**Table 2 – Proposed cancer education programme, SEOR.**

| Oncology Know   | Be aware of   |  |
|---|---|--|
| <ol style="list-style-type: none"> <li>1. Cancer in the health care context: Current status and achievements. Epidemiology and cancer registry.</li> <li>2. Principles of tumour biology (I). Cell structure. Cell Kinetics. Proliferation and apoptosis. Oncogenes and suppressor genes.</li> <li>3. Principles of tumour biology (II). Tumour progression. Invasion and metastasis. Growth factors. Recognize, diagnose, and manage.</li> <li>4. Risk factors that predispose to the development of the most common cancer types. Mechanism of carcinogenesis.</li> <li>5. Primary and secondary prevention.</li> <li>6. Tumour pathology. Diagnostic methods. Hereditary cancer. Genetic counselling in cancer.</li> <li>7. Diagnostic methods in cancer. Endoscopy/PET.</li> <li>8. Cancer: clinical signs and symptoms and staging. Cancer diagnosis: diagnosing tumour dissemination. TNM Classification system.</li> <li>9. Assessing therapeutic results. Evaluation of the response to treatment and effects on quality of life. Follow up</li> <li>10. Principles of Cancer Surgery. Interaction with other treatment methods.</li> <li>11. Principles of Radiation Oncology. Biological bases. External radiotherapy. Brachytherapy. Clinical dosimetry.</li> <li>12. Principles of Chemotherapy. Principles of Hormonotherapy. New therapeutic targets.</li> <li>13. Tumours of unknown origin and paraneoplastic syndrome</li> <li>14. Supportive care treatment in cancer patients. Acute toxicity from cancer treatment. Diagnosis and treatment of pain.</li> <li>15. Supportive care treatments in cancer patients. Oncological emergencies.</li> <li>16. Digestive cancers: stomach and colorectal. Predisposing diseases. Therapeutic approach. Principles of combined treatment.</li> <li>17. Cancer and tobacco: lung cancer, head &amp; neck cancer. Diagnosis. Therapeutic protocols.</li> <li>18. Breast cancer. Biological behaviour. Diagnosis. Therapeutic protocols.</li> <li>19. Urological tumours.</li> <li>20. Female genital tumours.</li> </ol> | <ol style="list-style-type: none"> <li>1. Carcinogenesis.</li> <li>2. Tumour cell growth.</li> <li>3. Mechanism of tumour invasion and metastasis.</li> </ol> |  |
|   | Oncology Know how to  |  |
| Competently. . .  | Perform under supervision. . .  | Have seen it practiced. . .  |
| <ol style="list-style-type: none"> <li>1. Take a cancer-oriented patient clinical history</li> <li>2. Recognize, on physical examination, the most common tumours and their complications, with a focus on the natural history of these tumours.</li> <li>3. Manage the most common tumours and their complications.</li> <li>4. Indicate and interpret complementary tests to diagnose the nature and extension of different tumour types</li> <li>5. Indicate early detection and screening procedures.</li> <li>6. Indicate the diagnostic procedures for tumours given the warning signs and symptoms</li> <li>7. Manage the most common symptoms likely to occur in the course of the disease.</li> </ol>  | <ol style="list-style-type: none"> <li>1. General management of cancer cases</li> </ol>   | <ol style="list-style-type: none"> <li>2. Interventional procedures for diagnosis and treatment of cancer patients.</li> </ol> |

**6.2. Skills and knowledge**

- **Know** the basic aspects of tumour biology, carcinogenesis, epidemiologic data and risk factors that allow the physician to carry out his/her important role in cancer prevention.
- **Know** in which tumours screening for cancer should be done through pre-established screening campaigns. Future physicians must have sufficient understanding of the

- diagnostic yield of the tests, economic costs, and sensitivity and specificity of the test used. He/she must also know the warning signs and symptoms of the different types of cancer in order to reach an early diagnosis that will allow for early therapeutic intervention.
- **Know** the indications in each case regarding the possible treatments. Likewise, the physician must have sufficient knowledge of the possible side effects of these treatments,

about the life expectancy of the patient, and what follow up steps should be taken.

- **Provide** psychological support to the patient and his family, and be capable of informing them of the nature of the illness.
- **Know** the complications of cancer treatments, in particular rehabilitation after treatments that involve the total or functional loss of an organ.
- **Know** the general aspects of supportive care in oncology, including pain management and the medical approach to terminal patients. A PCP with such knowledge is able to increase quality of life by avoiding unnecessary referrals to other specialized centres, which are often located far away, to treat clinical situations that do not require any sophisticated treatments.
- **Recognize** the symptoms of possible oncological emergencies, thus allowing for early diagnosis and referral to the appropriate centre.
- **Be aware of** follow up schemes for cancer patients. In this way, early detection of tumour relapse is improved, and the physician serves as a support to the specialized centre, thereby reducing the frequency of follow up controls in patients on long term follow up.

The programme proposed by the SEOM does not differ greatly from the one presented here, although it places less emphasis on the general aspects of cancer, preferring (as they openly recognize) instead to focus on the medical aspects and tumour types that are most relevant to medical oncology.

We believe that undergraduate students must have a broad understanding of cancer that is presented in a practical and useful manner. More specialized aspects should be left for postgraduate education. This approach contrasts with that proposed by the SEOM, in which the treatment of cancer with other important therapeutic modalities—such as surgery or radiotherapy—are not addressed. Moreover, as the educational programme proposed by the SEOM states, the general criteria used to include some tumours and reject others are as follows:

- The most common tumours in our country and those in which medical treatment is fundamental for treatment outcome.
- Tumours which are not common, but in which medical treatment has a special relevance or in which combined treatment is the basis for its prognosis.
- Tumours that do not meet the aforementioned criteria are not included, nor are those in which the medical aspects are addressed extensively in other parts of the medical school curriculum, such as: lymphomas, leukaemia, etc.
- Paediatric tumours are not included because these are considered in the corresponding course and because such tumours are beginning to be considered as a specialized category of their own.

## 7. Conclusions

A committee appointed by the SEOR Board of Directors decided to take a pragmatic approach to present concerns about

medical education in Spain. The team prepared and sent a letter to all medical school deans in Spain. The main aim was to explain SEOR's concerns and proposals regarding undergraduate education in oncology. See annex 1 for a complete copy of the letter that was distributed to the deans of faculties of medicine in Spain on April 13, 2013.

## Conflict of interest statement

All the authors state that they have no conflicts of interest to declare with regards to the editorial submitted for publication.

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This article is dedicated to our distinguished colleague Prof. Dr. Vicente Pedraza former President of SEOR, former Dean of the Faculty of Medicine at the University of Granada, former President of the Spanish Commission of Radiation Oncology and Spanish University Council.

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