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Research article

A review of the Best Practice in Radiation Oncology project from 2008 to 2018



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ABSTRACT

The European Society of Radiotherapy and Oncology (ESTRO)/International Atomic Energy Agency (IAEA) Best Practice in Radiation Oncology—a project to train RTT trainers has reached its ten year anniversary and will commence its fifth iteration in 2018. This project commenced as a novel way to address the issue of limited RTT education throughout Europe. In many countries the profession of RTT is not officially recognised and there is no formal education programme. RTT education is frequently a very short component of a broader programme such as diagnostic imaging, nursing or a technical discipline. To date, fifty-nine short courses have been delivered, two RTT-specific National societies have been developed, a South East European cooperation with biannual conferences has evolved and significant progress has been made on improving the radiotherapy-specific content of national educational programmes, which will continue with future iterations of this project.

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Introduction

2018 marks ten years of the ESTRO/IAEA Best Practice in Radiation Oncology – a project to train RTT trainers. This was a novel approach to first, encourage improvement in RTT education by targeting motivated clinical RTTs to develop and deliver short courses on key topics to their colleagues and second, to try to influence the education content of national education programmes. This was a novel and experimental project, which yielded results beyond expectation as well as demonstrating the real need to actively address the education and professional profile of RTTs internationally.

Background

Radiotherapy is an integral component in the treatment of cancer patients. It is a complex technology with high-level precision in preparation and delivery essential for optimal patient outcome and safe practice. Developments over the last decades with respect to technology and its application, a deeper understanding of cancer as a disease and increased patient and public awareness of the risks associated with this treatment modality have been immense and have led to a greater focus on safe and accurate treatment linked with changing roles and responsibilities within the radiotherapy team: the radiation oncologist, radiotherapy physicist and the RTT (an acronym denoting the professional delivering radiotherapy to patients).

Education programmes for RTTs should provide the scientific basis of the profession and enable graduates to be able to synthesise, evaluate and apply their knowledge in a clinical setting [1]. Graduates from undergraduate or postgraduate programmes should have reached the level of competency to practice as an

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autonomous professional and effective member of the radiotherapy team. Failure to achieve this can result in inaccurate treatments leading to unacceptable disease progression and severe side effects impacting significantly on the patient's quality of life [2]. This paper outlines an innovative intervention to address the deficiencies in RTT education and to evaluate the outcomes of the intervention.

In many countries the profession of RTT is not officially recognised and there is no formal education programme. RTT education is frequently a very short component of a broader programme such as diagnostic imaging, nursing or a technical discipline. The academic content is limited and clinical education may only include a short number of weeks, as demonstrated by an extensive survey carried out as part of the third revision of the ESTRO core curriculum for RTTs [3]. This ad-hoc educational structure is associated with the lack of a unified title for the profession, limited professional recognition and status as well as impacting directly on the ability to deliver optimum treatment and care and, in many instances a failure to retain staff. There is frequently no commitment at Government level, amongst the other involved professional groups or within the educational institutions in many countries to acknowledge this gap in RTT education, which, given the potential for adverse outcome for patients with the incorrect delivery of treatment, is particularly striking.

The European Society for Radiotherapy and Oncology (ESTRO), which represents the core radiotherapy professionals including RTTs, and the International Atomic Energy Agency (IAEA) have supported a range of initiatives aimed at raising the education level of RTTs. These include the preparation, review and publication of recommended core curricula, the provision of a wide range of radiotherapy specific courses, a full track for RTTs at the annual ESTRO congresses and involvement of RTTs in National Society meetings and a range of initiatives by the IAEA to support local and national education. These initiatives have succeeded in raising awareness within the community of the roles and responsibilities of the RTT but have not succeeded in influencing national educational programmes to any significant extent. One of the aims of this project was therefore to try to influence the national educational institutions to increase the radiotherapy component of their programmes.

The first two European Core Curricula for RTTs addressed curriculum content, the educational setting and the need for a European or global professional identity and the third revision, published in 2011, linked scope of practice with core competences and curriculum content. The revised IAEA curricula for Radiation Therapists focused on curriculum content and considered options for the graded introduction of RTT education in settings where there is no existing programme. Given the historical structure of RTT education and to address the specific problems associated with RTT education a range of additional options were considered. Previous suggested approaches had included a site-specific one-week immersion course with some time dedicated to lectures on teaching methodology and course development, following which the participating RTTs would be required to prepare and deliver a similar course to their colleagues in their own country. This approach had not been very successful in the past and a core group within ESTRO was identified to analyse the possible reasons and to consider other potential models.

Methodology

The failure of previous models could be attributed to several factors: a lack of interest in the topic offered, lack of support, time and resources in RTTs' own country, feeling isolated and overwhelmed by the task facing them and the failure of the educational institutions to address the curriculum content in a meaningful

way. To address these factors a new model was proposed and discussed with the ESTRO Education and Training Committee (ETC) in June 2007, called "Best Practice in Radiation Oncology – a four phase project to Train RTT Trainers" (Train the Trainers). The International Atomic Energy Agency (IAEA) was also committed to improving the educational status of RTTs in low to middle income countries and agreed to participate in a joint ESTRO/IAEA approach.

The factors identified as possible causes of failure were addressed individually. With respect to the lack of support and sense of isolation it was agreed that a group of three participants from each country should attend a workshop, providing part of the support network lacking in other models. Additional ongoing support by the project faculty was also reviewed and the ESTRO e-learning platform EAGLE was selected to provide this on a pilot project basis. It was considered important that the courses prepared and delivered locally as part of the project should have maximum professional and educational impact and it was agreed therefore that, ideally, the three participants attending should represent the clinical environment, the academic environment and the profession's National Society.

With respect to the topics selected it was agreed that it would be more appropriate to have the participants identify topics that were considered important for the RTTs in their country or department. It was felt that this increased the potential for motivation and successful course development subsequently but required a new approach to the initial intensive workshop.

Given the overall aim for sustainable improvement in the education of RTTs in individual countries at local and national level and the requirement to provide short courses locally and/or nationally it was agreed that two years per project group would be a realistic time frame with the requirement for each group to prepare and deliver three short courses during this period. Each course should be a minimum of two days in length. The first course should be delivered during the first year and, as part of the ongoing support, a three-day follow-up/review/consolidation workshop was scheduled for the end of the first year.

The structure and content of the first intensive week was then discussed. The focus of the intensive week was to enable each group to prepare a draft outline of the first short course that they would deliver locally. The individual components that needed to be addressed when preparing a short course were then outlined and a draft programme agreed. The themes for each day were identified: introduction and defining course content, lecture preparation and delivery, practical issues and preparing a timetable. Each day consisted of introductory lectures followed by individual group workshops, individual group feedback and full group discussion. All participants were required to make at least one presentation.

To assist the participants and to give the process structure and focus a series of templates were developed. The first template was sent out for completion prior to the course giving the background to the project and requesting information on the educational programme for RTTs in the country, the potential topics for consideration and any current links with the educational institute. This template was subsequently amended to include links with groups who had previously participated in the project. This template was reviewed by the faculty prior to the intensive week to indicate the level of support that might be required by the individual groups. The second template focused on the first short course to be developed by each group and included details on the topic, likely participants, learning outcomes, content, faculty, teaching methods, assessment, course evaluation and links, if any, with the second and third proposed courses. Templates were also prepared for the second and third courses. An organisational flow chart incorporating all the elements relating to the practical organisation of the course, how to create a realistic budget and ways in which costs

could be managed was also developed. A checklist and course evaluation form completed the package. The template for the first course was used as the focus for the workshops and was completed by the participants for each discussion session. Modifications to the lecture content and templates were made for the second and third projects with a significant reduction in the lecture content. Recorded seminars on teaching methodology and assessment by the faculty were made available to the participants through ESTRO's virtual learning environment, EAGLE (superseded by MOODLE™), together with reference materials and resources on a range of educational aspects.

The project was advertised through the ESTRO website and newsletter, the IAEA Technical Cooperation programme and to the professional National Societies. Nine countries were selected to participate in the first intensive week, which commenced on 31st August 2008 in Vienna.

Results

Primary outcome-course development and delivery

Four full projects have been completed: 2008–10, 2010–12, 2012–14, 2016–18 and the fifth project commenced in October 2018.

It became apparent early on in the process that it would not be possible to meet the original aim of mixed representation for each participating group. The representation of RTTs within the educational institutes or in the National Societies was minimal or non-existent and therefore it was agreed to accept three clinical RTTs to participate. Estonia, who participated in the first iteration, was in fact the only country to send a group representing the three areas, while the Portuguese group consisted only of lecturers from the University of Lisbon. The issue of RTT representation on the National Societies has been addressed through a separate ESTRO initiative, which is beyond the scope of this article.

1st Project: 2008–2010

For the first iteration, eight of the nine selected countries participated, with Georgia having to withdraw due to unforeseen circumstances. The eight countries were: Bosnia and Herzegovina, Croatia, Cyprus, Estonia, The Former Yugoslavia Republic of Macedonia, Poland, Portugal and Serbia. The RTT specific educational background ranged from a few weeks in five instances to a full degree programme offered in two countries. This was reflected in the desired outcomes expressed by the groups which focused on raising the standard of local education programmes, upgrading knowledge and skills, improving the standard of clinical practice and raising the professional profile.

The first intensive week was a learning experience for both the participants who had expected a full lecture programme and for the faculty where total flexibility and 'thinking on your feet' was the order of the week. However the structure worked very well once established and all groups had a skeleton programme drafted by the end of the week. Communication with the groups was maintained through email with draft programmes and lecture content circulated for comment and feedback. Unlike other teaching courses in the ESTRO School, this collaborative project with the IAEA demands ongoing contributions from the faculty in terms of support to participants as well as extensive redevelopment of the ESTRO virtual learning environment, EAGLE by the faculty members. The anticipated use of EAGLE as a follow-up and communication tool did not come to fruition until the start of the fourth iteration in October 2014.

Seven groups succeeded in preparing and delivering a course within the first year of the project and the eighth group completed within 18 months. All first courses were attended by at least one faculty member who provided support and gave feedback to the course directors. The consolidation workshop was held in Maastricht in 2009 and each group, together with the faculty member who had attended the course, presented their feedback. This was a very significant result given the difficulties faced locally by the majority of the groups and the fact that they would have had little or no experience in either course preparation or delivery. The level of enthusiasm and pride in their achievements was palpable and a strong network had developed between five of the Balkan countries with cross-country cooperation and course attendance further enhancing the impact. The main problem that arose was the perceived ending of the support for the individual groups by the faculty after the consolidation meeting. This had not been anticipated and ongoing support remains a resource issue.

Six countries continued with the project delivering a number of additional courses over the second year (Table 1). Email contact between the groups and faculty members was again maintained to provide advice and support.

Project 2: 2010–2012

Seven countries were represented at the second project, which commenced in August 2010: Bulgaria, the Czech Republic, Kazakhstan, Malta, Montenegro, Poland and Serbia.

Four of the seven groups in the second project succeeded in delivering at least one short course (Table 1). Two of the groups worked to develop education programmes nationally – one at undergraduate level and one at postgraduate and in Kazakhstan; where the role of the RTT was carried out by different professional groups; they addressed this by aiming to provide basic education in the area.

Project 3: 2012–2014

Eight countries participated in the third project which commenced in September 2012: Bosnia & Herzegovina (Sarajevo and Banja Luka), Bulgaria, Croatia, the Czech Republic, The Former Yugoslavia Republic of Macedonia, The Russian Federation and Slovakia. Continuity of educational development within countries was maintained through the further participation of a second group.

Seven of the eight teams from the third group have developed and delivered at least one short course and some teams up to three courses. One team has worked on the development of a full one-year programme for RTT education.

Project 4: 2014–2016

Eleven groups took part, highlighting the continued need and enthusiasm for this project. The countries represented were Albania, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Russian Federation, Serbia, Turkey and Former Yugoslavian Republic of Macedonia. This iteration of the project had also seen a significant advancement in the use of EAGLE, both during the intensive week, with webinars and discussion fora, through EAGLE planned for the follow-up, instead of email communication alone, as in previous editions.

Project 5: 2016–2018

Fourteen groups took part, representing the largest project to date and confirming the continued need and motivation for this project. The countries represented were Azerbaijan, Bosnia and

Table 1
Train the Trainer short courses delivered between 2008 and 2018.

Country	Course title
Albania	1. Gliomas
Azerbaijan	1. Total Body Irradiation
Bosnia and Herzegovina (Sarajevo, Banja Luka and Tuzla)	1. Professionalism in Radiotherapy 2. Education including clinical practice 3. Patient positioning verification and MV imaging 4. Positioning and immobilisation of Head and Neck Cancer – Quality Control 5. Workflow and efficiency in the department
Bulgaria	1. CT Planning in Radiation Oncology 2. Contouring Organs at Risk 3. Patient positioning and verification 4. Patient positioning and immobilisation in radiotherapy 5. Breast cancer
Croatia	1. QA in Radiotherapy Technology (OIS) 2. Legislation, Regulations, Recommendations 3. QA in Radiotherapy – Patient positioning 4. QA in Radiotherapy – an introduction to IGRT 5. Symposium on competencies and skills of Radiation technologists 6. Evaluating Treatment Plans
Cyprus	1. An introduction to IMRT 2. Risk Management
The Czech Republic	Radiobiology
Estonia	1. Improved QA for 3DCRT 2. Acute and Late Adverse Events 3. Advanced Techniques and Technologies in Radiotherapy 4. Communications and Side Effect Management 5. Improving treatment accuracy through RTT plan evaluation
Georgia	1. Positioning and immobilisation in oesophageal cancer
Kazakhstan	1. Pelvic cancers 2. High-tech radiation therapy for laboratory assistants of beam accelerators
Kyrgyzstan	1. Positioning and immobilisation in oesophageal cancer 2. Image acquisition, treatment planning and patient management on treatment 1. Strengthening knowledge and skills in radiotherapy quality and safety
Latvia	1. Radiobiology
Lithuania	2. Brachytherapy Techniques
The former Yugoslav republic of Macedonia	3. CT simulation for Breast cancer 4. Skin Cancers 5. First treatment of patients with rectal cancer – standard position vs. bellyboard
Malta	1. State-of-the-Art radiotherapy in Malta – 3D IGRT and VMAT for prostate cancer
Montenegro	1. Portal imaging
Poland	1. QA in Prostate Cancer 2. Basic Treatment Planning 3. Symposium of the Polish Electroradiology Society
Portugal	QA – Incident Reporting, Evaluation and Prevention
Romania	1. 1 day per month for 6 months to improve knowledge and skills of RTTs
Russia	1. Four week programme for RTTs 2. Additional two week programme for RTTs
Serbia (Belgrade, Nis, Sremska Kamenica)	1. Breast Cancer – Contemporary Radiotherapy 2. Modern Transcutaneous RT 3. Contemporary Approaches in Radiotherapy 4. Brachytherapy 5. Importance of communication with patients in Radiotherapy 6. Orthovoltage Radiotherapy and the importance of Quality Assurance in radiotherapy 7. Head and neck radiotherapy 8. Positioning and immobilisation in paediatric radiation oncology 9. Challenges in radiotherapy treatment of elderly patients (management of the elderly patients)
Slovakia	1. Positioning and immobilisation in Head and Neck malignancies 2. Quality Assurance
Turkey	1. Side effects of nasopharyngeal cancer radiotherapy and patient care 2. Positioning and immobilisation techniques in head and neck cancer 3. Quality Improvement team in radiation oncology – where do we stand
Ukraine	1.

Herzegovina, Bulgaria, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Malta, Montenegro, Romania, Serbia, Turkey and Ukraine. Moodle™ replaced EAGLE as the platform for sharing information.

Several countries have tried to send groups to each project to maintain the momentum and provide a Continuous Professional Development (CPD) programme nationally. Groups have represented different clinical departments, cities or regions disseminating knowledge and information widely throughout participating countries.

With respect to the courses delivered, the majority of courses were delivered in the language of the country. In some instances the slides were in English or in two countries simultaneous or sequential translations were provided for the faculty member attending. Faculty members reviewed the organisation, participation level and the overall structure and standard of the programme. Participants were frequently of mixed profession, with Radiation Oncologists and Medical Physicists attending several of the courses. This interestingly highlighted the lack of continuing

education for the other professional groups in these countries too. Participant numbers ranged between 20 and 100 and most courses were very positively received. Several courses had a practical as well as a theoretical session and tours of radiotherapy departments were also included where possible. This was also a steep learning curve for the course organisers as practical sessions, whilst a very good learning method, require a significantly greater level of organisation and faculty input to be successful.

Course evaluation consistently focused on the confidence gained by organising RTTs through the intensive week and the commitment to work towards organising their course. Participants found the courses challenging and intensive but very satisfying. They indicated the need for ongoing support through the presence of experts at their own short courses, help with journal article selection and lecture content and ongoing resource requirements. The networking between groups was considered as very valuable but some participants had problems with communication between the different languages.

Secondary outcomes: National education programmes and national society development

One of the aims of the project was to try to influence the national educational institutions to increase the radiotherapy component of their programmes. This has remained a considerable obstacle and the IAEA hosted a meeting in 2014 aimed directly at the education institutions in the participating countries to discuss this issue. In the Tartu Health Care College, Estonia a one year dedicated programme in radiotherapy for RTTs was established and in Malta a national degree programme has been developed. There has been a raised awareness of the lack of focused education in radiotherapy but influencing curriculum content continues to be problematic. An MSc programme has been established in Croatia and several of the TTT participants have graduated.

At the National Societies level, Serbia and Bulgaria have established their own RTT societies and for several other countries the RTT presence in the National Societies is much more prominent with a dedicated RTT track now more commonplace at the national study days. Together with other initiatives in ESTRO this has resulted in attendance at the ESTRO National Societies day of representatives of the RTT community in the individual countries and in a stronger network of committed RTTs working together to raise the professional profile, educational level and standard of clinical practice. It has also led to the development of the ESTRO RTT Alliance where national RTT societies can join ESTRO bringing the benefits of membership to a larger number of RTTs at an affordable cost.

The original contributors to the project from this region continue to work together in a focused and innovative manner and in 2013, the first Balkan regional conference (under the umbrella South East Europe Technology in Radiation Oncology-SEETRO) was organised by participants from Serbia, Croatia, The F.R.Y. Macedonia, Slovakia and Bosnia and Herzegovina and held in Belgrade, a direct result of the collaboration of the first groups from the TTT project. There have subsequently been two further iterations of this conference with the fourth anticipated in 2019.

Discussion

The development of dedicated education programmes in RTT or the inclusion of an acceptable RTT component in existing programmes continues to be challenging in many countries. The work of the ESTRO and the IAEA in defining curriculum content through the recommended Core Curricula and recommended educational syllabus for RTTs, the development of an ESTRO benchmarking document at European Qualifications level 6 (EQF 6), the inclusion of a dedicated RTT track at the ESTRO annual European congresses, invitations to attend the National Societies day, a dedicated series of short courses aimed at RTTs are some of the initiatives that have succeeded in highlighting the difficulties associated with RTT education and providing some resources to assist in addressing them.

The Train the Trainers project represents a practical 'on the ground, bottom-up' approach to empower motivated RTTs to take the initiative to address for themselves their educational needs and those of their colleagues. The topics selected for the short courses organised through the Train the Trainers project reflect the gaps in many existing undergraduate programmes and provide knowledge and skills to the participants attending the courses. An increase in the collaboration and linkages between clinical RTTs and educational institutes has been observed over the four editions of the project thus far, significantly assisted by the opportunity for representatives from educational institutes to liaise with the course directors from ESTRO and the IAEA at an IAEA-organised meeting in 2014 and 2015. Whilst the impact of these meetings was not immediately obvious some of the changes that have taken place as a result of this development indicate that the original overall aim of the TTT project in raising awareness of RTT education programmes across Europe has commenced and will continue to grow with the future editions of this project.

Conclusion

This article has reported on 10 years' experience of the ESTRO/IAEA TTT project. To date, 59 short courses have been delivered, two RTT-specific National societies have been developed and significant progress has been made on improving the radiotherapy-specific content of national educational programmes, which will continue with future iterations of this project.

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