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Short communications and technical notes

Evaluation of RTT education – Is it fit for the present: A report on the ESTRO radiation therapist workshop

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ABSTRACT

Education is key in preparing healthcare professionals for the current and future needs of the clinical environment. Hence, ESTRO facilitated a workshop, with a track focusing on radiation therapists' (RTT) education and whether it is fit for the current demands of RTTs. An international group of participants with academic and clinical backgrounds discussed the current situation in their respective working environments, evaluated the challenges in RTT education, and highlighted opportunities and possible solutions to meet current and future needs. Key outcomes highlighted the importance of strengthening collaboration between clinical and academic staff.

Introduction

Radiotherapy (RT) is an effective, personalised cancer treatment that has benefited from significant advancements in radiation medicine technology, information technology and imaging associated with the growing ability to identify and target tumours with accuracy and precision. These advances have played a central role in the success of RT as a core component of comprehensive cancer care. However, behind the advanced technology and innovative treatment lies a critical foundation: the education and training of radiation therapists (RTTs). RTTs are essential members of the radiation medicine interprofessional team, responsible for delivering precise radiation treatments while providing compassionate support to patients, families, and caregivers. Their expertise in treatment planning, technical proficiency in RT delivery and commitment to patient care ensure the safe and effective delivery of RT, contributing significantly to optimal treatment outcomes and patient experiences.

RT education programs serve as the foundation for future RTTs, facilitating the acquisition of knowledge, skills, and competencies essential for safe and effective clinical practice. However, the landscape of RTT education exhibits significant heterogeneity [1], both in terms of curriculum content and instructional methodologies.

Central to the discourse on RT education standards is the role of benchmarking standards established by organizations such as ESTRO. Various documents and standards exist such as the ESTRO European Higher Education Area Level 6 Benchmarking document for Radiation Therapists [2], IAEA Handbook for the Education of Radiation Therapists [3], the updated ESTRO core curricula 2011 for clinicians, medical physicists and RTTs in radiotherapy/radiation oncology [4]. These standards serve as a guiding framework for the development and evaluation of RT education programs, aiming to uphold excellence and consistency in training methodologies. However, the extent to which these benchmarking standards are integrated into existing RTT education curricula is not well defined.

Amidst the persistent discrepancies, ESTRO organized a workshop centred on current RT education, training and benchmarking standards. This paper presents a synthesis of the central themes and recommendations that emerged from the workshop, offering valuable insights into the evolving landscape of RTT education and its implications for clinical practice and patient care.

Methods

ESTRO convened the workshop "Evaluation of RTT education – is it fit for the present" focused on current RTT education curriculum and benchmarking standards. The workshop aimed to bring together RTTs

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with academic or clinical backgrounds from various geographical regions to explore the impact of ESTRO benchmarking standards on existing RT education core curricula, identifying gaps in education frameworks, and provide recommendations for standardization and improvement.

Workshop structure

The workshop spanned two intensive two-hour sessions (November 15, 2022 and February 16, 2023), structured to facilitate in-depth discussions, collaborative problem-solving, and consensus building among participants. Each session comprised of focused presentations, interactive discussions, and targeted activities aimed at achieving the workshop's objectives.

Topics explored

1. Impact of ESTRO Benchmarking Standards: Participants critically examined the relevance and applicability of ESTRO benchmarking standards to current RT education core curricula. Participants drew upon their collective expertise and experiences to assess the alignment between benchmarking standards and educational outcomes, identifying areas of congruence and divergence.
2. Examination of Existing Educational Frameworks: Workshop participants discussed existing RT education frameworks, identifying strengths, weaknesses, and opportunities for improvement.
3. Identification of Competency Gaps: A central focus of the workshop was the evaluation of competency gaps within RT education. Again, participants drew on their collective expertise to delineate essential competencies required for effective clinical practice, considering both technical proficiencies and interprofessional skills. Through scenario-based discussions, participants identified areas warranting enhanced emphasis and integration into educational curricula.
4. Leveraging Clinical Educators' and Practitioners' Experiences: Recognizing the pivotal role of clinical educators and practitioners, the workshop explored strategies to bridge the gap between education and practice. Drawing upon their firsthand experiences in clinical settings, participants described the challenges and opportunities in translating theoretical knowledge into practical skills. By fostering collaborative partnerships between academic institutions and clinical settings, participants envisioned innovative approaches to experiential learning, preceptorship programs, and interprofessional collaboration, aimed at enhancing the seamless transition from education to practice.

Results

The workshop assembled a diverse group of stakeholders, comprising academic educators, clinical educators, and clinical practitioners, whose reported primary roles were evenly distributed, with several indicating mixed roles. The 21 participants,17 contributors and 4 faculty, were from 18 countries, including 6 non-European countries [Fig. 1] ensuring a broad spectrum of perspectives and experiences in RT education. The duration of the RT education and training programs in each representative's country varied, ranging from 1 year to 4 years. The majority of programs were structured as Bachelor's degrees (3–4 years) with curriculum shared between medical imaging and radiotherapy specialities (mixed-discipline programs). Dedicated RTT programs were standardly reported in New Zealand, Australia, Ireland, and Canada).

In review of the current ESTRO benchmarking document for RTTs [2], participants discussed the relevance and applicability of the 11 core competencies (Table 1) detailed for entry-to-practice RTTs in participants' own countries. There was clear consensus on the relevance and applicability of all core competencies, with participants emphasizing the importance of core competencies that extend beyond RTTs technical responsibilities, specifically the intra and interprofessional communication, education, and research domains.

When exploring how adequately the 11 core competencies are currently being achieved within existing RT education and training programs in participants' respective countries, external beam treatment delivery and professionalism were consistently identified as being adequately met, along with additional technical competencies including image acquisition and simulation, positioning and immobilisation, and quality assurance. Higher variability amongst the participants was reported for inter- and intra-professional communication, on treatment verification and research. Treatment planning, education and

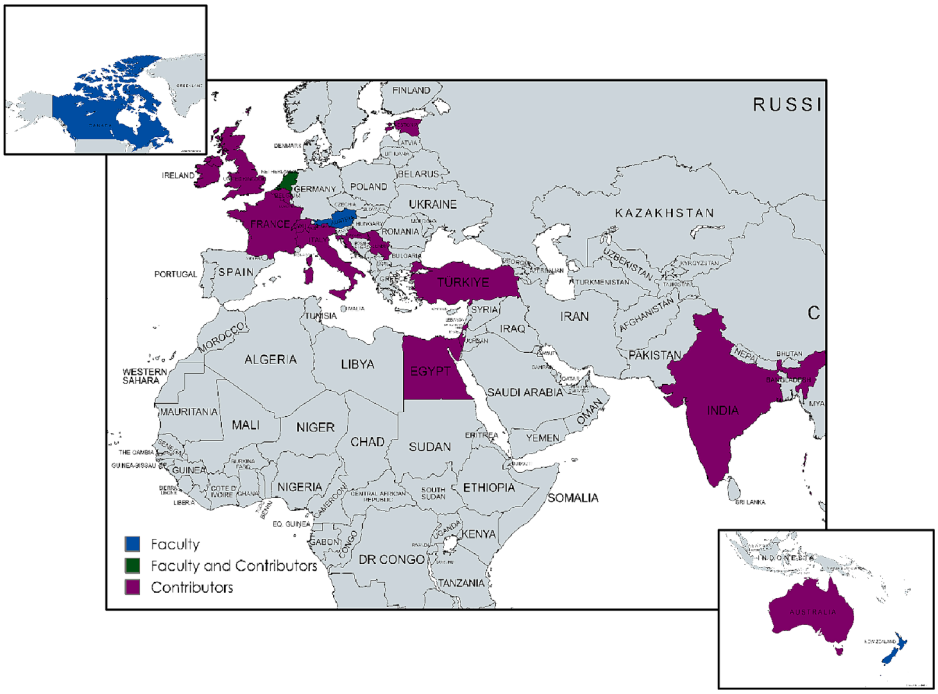

Fig. 1. Countries represented by contributors and faculty.

Table 1
Core competences as listed in the ESTRO benchmarking document (Level 6) [2].

1. Professionalism
2. Inter and Intra professional communication
3. Positioning and Immobilisation
4. Image Acquisition and Virtual Simulation
5. Treatment Planning
6. On treatment Verification
7. External Beam Treatment Delivery
8. Quality Assurance
9. Brachytherapy
10. Research
11. Education

brachytherapy were more consistently reported as competencies not being adequately met by RT education programs across participants.

The impact of not adequately meeting the core competencies was also explored. Participants agreed that education programs that do not effectively address the core competencies within their curriculum jeopardise the quality, safe preparation, and delivery of radiation therapy. Furthermore, the inability to comprehensively acquire all core competencies hinders RTTs from expanding their roles and responsibilities, including the specific progression towards advanced practice roles.

Participants then identified contributing factors in the variability of achieving the core competencies across RT education and training programs represented within the workshop. The primary contributing factor was the lack of RT dedicated curriculum within mixed-discipline programs, as most content focuses on medical imaging. Participants reported that less than 30 % of curriculum within mixed-discipline programs was dedicated to RT resulting in the inability to meet the ESTRO benchmarking standards [2]. Participants indicated that treatment verification as well as fundamental principles and theory (e.g. radiobiology) were critical gaps in these mixed-discipline programs. Limited RTT faculty was also frequently raised as a barrier. Further compounding these challenges is the accelerating rate of change in the clinical environment. Participants discussed the increased depth and breadth of knowledge and experience expected of new RTT graduates to be able to deliver care using emerging and new clinical technologies and techniques. While expressed jointly by those representing countries with dedicated and mixed-discipline RT programs, the challenge of addressing both foundational principles of practice and increasingly specialised clinical workflows in radiation oncology were considered markedly more difficult in a mixed-discipline program setting.

Given that participants crossed both academic and clinical roles, an emerging theme of the workshop was the importance of bridging the gap between education and practice via academic and clinical partnership. Several potential outcomes were discussed, showcasing the importance of a close collaboration between educators and clinical staff. Particularly in the context of mixed discipline programs with limited RT content, participants highlighted that the inability of education programs to meet benchmarking standards force employers to address the critical gaps via institutional onboarding. This results in challenges for employers as they are required to resource a broader scope of training delivery alongside clinical operations and also poses challenges for new RTT graduates as they are required to upskill from a suboptimal base competency rather quickly to support clinical operations. Additionally, education programs that are poorly aligned with clinical practice lead to unrealistic expectations of graduates resulting in reduced job satisfaction and a risk of poor retention rates. Alongside these risks, the value of successful academic and clinical partnerships was also highlighted. The benefits typically emerge from the "cross-fertilization" hypothesis leading to a better understanding and application of evidence-based practice, as well as continuous review and alignment of the education program relative to current and emerging practice patterns. A close academic-clinical partnership also facilitates realistic expectations among graduates at the point of entry to practice and supports more effective student engagement during practical placements. Similarly, cooperation in research projects as well as collaborations with the industry were mentioned as potential benefits for academic and clinical partnerships influencing future practice.

Discussion

The international variation, and shortfall, in education standards for RTTs at the point of entry-to-practice has been previously explored in the literature. In a survey of 30 countries, Coffey et al [1] reported that majority of RTT education programs dedicate less than 20 % of curriculum content to RT. Unsurprisingly, this emerged as a central point of focus within the workshop in regards its impact on the quality and consistency of RT practice, and ultimately, the efficacy of patient care. This lack of uniformity can lead to suboptimal definition of RTT scopes of practice, adverse effects on the professional status of RTTs and challenges with career progression as well as compromising staff recruitment and retention. Furthermore, this situation is foreclosing the free movement of the RTT workforce across Europe, one of the basic principles of the European Union. Such discrepancies not only hinder the standardization of educational outcomes but also pose challenges in ensuring the uniform and safe delivery of high-quality care to patients worldwide.

Participants reported that insufficiencies in RT education programs inevitably require extended onboarding of new staff by experienced RTTs. This increases the workload of senior RTT team members, who are currently already reporting high rates of burnout and also raises potential safety concerns. Of note, research literacy was raised multiple times as a common gap in RT curricula. This was not only in the context of encouraging a more research active RTT workforce, but also in providing early career practitioners with the capability to appraise and apply research findings to their local clinical context. Such skills provide a foundation for ongoing practice development, as well as an additional avenue to enable new graduates to direct their own learning if entering the workforce with limited RT experience.

One of the most valuable points of consensus achieved through the workshop is that a strong clinical and academic partnership is vital to support locally applied, contemporary training needs. Such a collaboration yields a rich ground for cross fertilisation and potential for both sides to benefit from each other. One such example is the hosting of academic staff to update their practical knowledge (and potentially skills), facilitating familiarisation with evolving workflows which ca be incorporated back into theoretical principles taught to students. Radiotherapy is confronted with a rapidly evolving technological environment offering new possibilities but also challenges in meeting the education needs that accompany such developments. Increased collaboration between academic and clinical staff allows for not only supporting solutions to the shortfalls currently identified, but also strengthening the voice of the profession in wider discourse to promote acknowledgement and support of RTTs as a specialised, and distinct workforce.

Conclusion

Overall, the workshop served as a catalyst for meaningful dialogue and knowledge exchange, elucidating key challenges and opportunities in RTT education. The insights gleaned from workshop discussions provide a foundation for future research, policy development, and collaborative initiatives aimed at advancing the quality and efficacy of RTT education globally. Key outcomes highlighted the importance of strengthening collaboration between clinical and academic staff, particularly in regions where RT-specific content is under-represented within education curricula.

CRediT authorship contribution statement

M. Campbell: Conceptualization, Writing – original draft. **A. Leong:** Conceptualization, Writing – original draft. **P. Scherer:** Conceptualization, Writing – original draft.

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.

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During the preparation of this work the authors used Microsoft Office Word (transcribe) and OpenAI (ChatGPT 3.5) to transcribe and summarize audio-recordings from the workshops. After using this tools/services, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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