Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

International Journal of Radiation Oncology biology • physics

www.redjournal.org

EDUCATION AND TRAINING

COVID-19: A Catalyst for Change for UK Clinical Oncology

Charlotte Elizabeth Coles, MRCP, FRCR, PhD,* Ananya Choudhury, MRCP, FRCR, PhD,[†,‡] Peter J. Hoskin, FRCR, MD,[‡,§] Christopher M. Jones, MRCP,[‖,¶] Ben O'Leary, MRCP, FRCR, PhD,[#] Tom W. Roques, MRCP, FRCR,[**,††] Hannah Tharmalingam, MRCP, FRCR, MD,[§,**] and Frances A.P. Yuille, FRCP(E), FRCR**,[‡‡]

*Department of Oncology, University of Cambridge, Cambridge, UK; [†]The Christie NHS Foundation Trust, Manchester, UK; [‡]University of Manchester, Manchester, UK; [§]Mount Vernon Cancer Centre, London, UK; [‖]University of Leeds, Leeds, UK; [¶]Leeds Cancer Centre, Leeds, UK; [#]The Institute of Cancer Research and The Royal Marsden Hospital, London, UK; **Royal College of Radiologists, London, UK; [††]Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, UK; and [‡‡]Edinburgh Cancer Centre, Edinburgh, UK

Received Jun 16, 2020. Accepted for publication Jun 21, 2020.

The United Kingdom has been severely affected by the coronavirus disease 2019 (COVID-19) pandemic. As the National Health Service (NHS) has urgently prioritized management of this outbreak, the UK clinical oncology community has had to adapt rapidly to maintain cancer services and training. These unprecedented times have altered countless aspects of cancer care, education, and research, providing a legacy that will extend well beyond the pandemic that catalyzed them. This editorial focuses on 3 key themes that distinguish the United Kingdom from many other countries.

The NHS and Clinical Oncology

Particular aspects of the organization of radiation therapy services in the United Kingdom have framed the response to COVID-19. The first is the NHS, which was established in 1948 to provide universal health care free at the point of delivery as a human right.[1] It has grown to become the largest publicly funded health service in the world, and almost all UK radiation therapy services are delivered by the NHS.

The NHS occupies a unique position in the national psyche and became integral to the government's key message during the lockdown: "Stay Home, Protect the NHS, Save Lives." The ability to plan and adapt quickly across the United Kingdom enabled rapid establishment of NHS Nightingale field hospitals for acute care and NHS Seacole centres to rehabilitate patients with COVID-19. Research and development is also embedded in the NHS through the government-funded National Institute for Health Research (NIHR), which supports clinical trials in every hospital. This structure enables rapid recruitment to national clinical trials, best illustrated by more than 10,000 patients being randomized among 6 different treatment arms in the

Corresponding author: Charlotte E. Coles; E-mail: colesc@doctors.org.uk

Disclosures: A.C. reports grants from the National Institute of Health Research (NIHR) Manchester Biomedical Research Centre; Cancer Research, UK; Medical Research Council, UK; Prostate Cancer, UK; and Bayer, UK. A.C. also reports personal fees from Janssen Pharmaceutical, nonfinancial support from ASCO, and grants and nonfinancial support from Elekta AB, outside the submitted work. C.E.C. and P.J.H. are supported by the NIHR Cambridge Biomedical Research Centre. All other authors have no disclosures.

Int J Radiation Oncol Biol Phys, Vol. 108, No. 2, pp. 462–465, 2020
0360-3016/$ - see front matter © 2020 Elsevier Inc. All rights reserved.
https://doi.org/10.1016/j.ijrobp.2020.06.041

RECOVERY trial for 8 weeks.[2] This is currently the largest randomized trial in the world investigating treatments for COVID-19.

The second aspect is the configuration of the specialty of clinical oncology (CO). The United Kingdom is one of the few countries that does not recognize radiation oncology as a separate specialty but has a combined specialty of CO delivering radiation therapy and systemic anticancer therapies.[1] Standards for UK radiation therapy are overseen by the Clinical Oncology Faculty of the Royal College of Radiologists (RCR), which also defines the curriculum for specialty training in CO.[3] Entry to a 5-year CO training program requires at least 4 years of postgraduate training in internal medicine. UK clinical oncologists are responsible for delivering more systemic treatment than either medical or hemato-oncologists.

These factors have conferred a number of advantages when delivering cancer care during the pandemic. Cancer policy could be decided nationally, with rapid production and adoption of guidelines such as the NICE radiation therapy guidance, which was published in late March 2020.[4] As cancer surgery ceased almost completely in some centers, clinical oncologists quickly agreed on site-specific guidance to support nonsurgical cancer treatments, including both radiation therapy and systemic therapy in all tumor types, mitigating risks of COVID-19 but compensating for lack of surgery. Within 3 weeks of opening, the RCR repository had 26 guidelines, which have been downloaded more than 20,000 times.[5] During the pandemic, clinical oncologists also provided an additional workforce with skills in internal medicine. Many were deployed to help treat patients in COVID-19 wards and to support acute medical rotas.

The UK, and by extension the NHS, response to COVID-19 has not been without significant challenges, including difficulties in the supply chain for personal protection equipment, the potential seeding of COVID-19 in care homes through inappropriate discharge decisions, and inadequate antigen testing capabilities.[6] The fallout from decision-making around these issues is likely to be debated nationally for some time, especially given that the United Kingdom has one of the highest excess deaths rates in Europe.[7]

Adapting Radiation Therapy for COVID-19

The United Kingdom has more than 3 decades of experience in developing high-quality, practice-changing randomized trials (RCTs) of hypofractionated radiation therapy in tumor sites including breast, urologic, lung, and gastrointestinal cancers.[8] In a pandemic, giving fewer fractions reduces risk of nosocomial virus transmission and improves machine capacity when staffing levels are reduced due to sickness or redeployment.

A national research framework fosters an inclusive, multidisciplinary approach with all UK radiation therapy centers encouraged to participate in centrally funded trials with support of the national Radiotherapy Trials Quality Assurance (RTTQA) group. This partnership of oncologists, physicists, radiographers, methodologists, and patient advocates has enhanced the quality of radiation research and accelerated the introduction of new radiation therapy techniques.[9]

An example pertinent to the pandemic is the FAST-Forward RCT in breast cancer. Engaging the research community and harnessing patient enthusiasm for the 3-week versus just 1-week breast radiation therapy trial design, this study recruited 4096 patients from 47 of the 62 radiation therapy centers across the United Kingdom in just 30 months. This was 2 years ahead of schedule and built on groundwork by the RTTQA group via the IMPORT trials.[10-12] In early March 2020, with the FAST-Forward 5-year primary outcome results imminent but unpublished, a core group of FAST-Forward trialists realized the need to offer urgent guidance for breast radiation therapy. The existing framework of the UK clinical trials community, RTTQA, and RCR provided an ideal background for collaborative working:

1. An international group of breast oncologists was convened over a weekend to produce emergency international guidelines for breast radiation therapy with authors from across the world.[13] The time from concept to preprint publication was about 2 weeks. The article appeared online on March 31, and by the end of April there had been more than 6000 downloads.

2. Concurrently, the UK group posted the breast radiation therapy guidelines on the open access RCR COVID-19 guideline repository. The FAST-Forward protocol and radiation therapy planning pack were circulated as a link within the publication and the RCR repository ahead of the primary results publication.

3. Work continued on submission and fast-track review of the FAST-Forward manuscript, which was published online on April 28.[10]

It has been more than a decade since the UK START B trialists reported 5-year primary endpoint results. The change to moderate hypofractionation has been very slow for a number of reasons, including concern regarding strength of evidence to support 15 fractions in certain subgroups such as those receiving nodal radiation therapy and financial concerns, with reimbursement systems based on payment per fraction.[14,15] In contrast, rapid adoption of the FAST-Forward protocol prompted by COVID-19 may mean we arrive at an international consensus on who should have 5-fraction breast radiation therapy within months instead of years so that our future patients have equitable access to evidence-based hypofractionation.

Education and Training

The coronavirus pandemic had an immediate and dramatic impact on training and recruitment of clinical oncologists across the United Kingdom. As hospitals worked quickly to prepare for COVID-19, many CO trainees were redeployed into acute medical or intensive care settings. Those remaining in oncology faced new challenges as they grappled with telemedicine, COVID-specific changes in practice, and increasingly complex risk-benefit decisions. Established training courses stopped suddenly, and examinations were canceled. The unfortunate cessation of the national recruitment program midway through a 2-day interview process because of the lockdown threw a previously well-tried and trusted process into disarray. Many trainees engaged in academic work also suspended their research and returned to full-time clinical work. Unsurprisingly, trainees reported considerable distress and frustration.

Strategies to mitigate the devastating impact of these acute challenges were initiated by national education bodies and consolidated by the RCR with strong input from the Oncology Registrars' Forum, a subcommittee of CO trainee representatives from across the United Kingdom. Flexibility has also been afforded to academic trainees to resume their research, and key funders are facilitating additional research costs arising from the unavoidable delays.

Longer term, the impact of COVID-19 on CO training is likely to be more positive. The emergency implementation of a self-assessment process for recruitment has made the value of face-to-face interviews clear. With local training schemes under pressure, the RCR was able to step in as the overarching source of trainee guidance and education. This drive for greater national consistency in training was galvanized by COVID-19, directed in particular by the agile initiatives of the Oncology Registrars' Forum and by sharing best practice with other specialties. Trainers and trainees are now empowered to use more modern teaching tools such as webinars and online fora. Many of these can be delivered nationally, to excellent quality-assured standards, and with best practice shared quickly. There has been real empowerment of a trainee body resolute in taking responsibility for shaping its own training in response to COVID-19, an ethos that must be built on going forward.

The Final Fellowship of the Royal College of Radiologists examination is taken in the penultimate year of training and consists of both written and practical components. Examination capacity is constrained by a clinical component held in a limited number of hospitals with a need for patient volunteers and written papers taken in a large central examination hall. Before COVID-19, discussions about modernizing the Final Fellowship of the Royal College of Radiologists were just beginning. The need for change was prompted by a call to reflect the real-life model of clinical decision-making[16] and the new 2020 training curriculum.

The changes enforced by the pandemic now present us with a great opportunity to transform the examination. Anticipating ongoing travel restrictions, the current intention is for examinations to be taken in a greater number of locations throughout the United Kingdom than previously. We will thereby provide an examination close to the candidate's training base, being cognizant of social distancing requirements that will be consistent across the entire country. Written examinations will be delivered in a digital format at each location. Structured oral examinations will also take place online, maintaining individual interaction between candidate and examiner independent of location. The examination will be recorded, with assessment by a second independent examiner, thus providing 2 assessments as would have been the case with the live examination. Because it will not be possible to hold face-to-face clinical examinations with volunteer patients, these practical assessments will be undertaken through additional stations in the oral examination. They will be based on curriculum-focused clinical vignettes with practical elements to demonstrate clinical skills and assess decision-making ability, such as a multidisciplinary meeting. The aim is to produce an examination format that is more versatile and responsive to increased capacity demands, evolves over time to reflect the changing needs of modern clinical practice, and is flexible to the trainee's needs. This model has potential for widespread adoption both within and beyond the United Kingdom. As in many other aspects of medicine, COVID-19 promises to be a catalyst of rapid and progressive change for the benefit of patients and health care professionals.

Conclusion

The full impact of the COVID-19 pandemic on the UK population remains to be seen, but high death rates, enormous lifestyle changes, and massive economic pressures will reshape society for generations. Cancer will still need treatment, and the CO community is well placed to adapt to the new order and change rapidly. Centrally funded services and structures can promote fast and widespread dissemination of new techniques and therapies. Our next generation of experts can benefit from a modern approach to training and examinations. Spending on health care may not match that of other nations, but we have potential to adapt and develop in response to this unprecedented challenge, providing access to high-quality, evidence-based radiation therapy, which remains free at the point of delivery to all in the United Kingdom.

References

1. Tait D. Radiation therapy in the United Kingdom and the wider role of the clinical oncologist. *Int J Radiat Oncol Biol Phys* 2014;89:1-3.
2. Wilkinson E. RECOVERY trial: The UK covid-19 study resetting expectations for clinical trials. *BMJ* 2020;369:m1626.

3. The Faculty of Clinical Oncology, the Royal College of Radiologists. Specialty training curriculum for clinical oncology. Available at: https://www.rcr.ac.uk/sites/default/files/2016_curriculum_-_clinical_oncology_15_november_2016.pdf. Accessed June 5, 2020.
4. National Institute for Health and Care Excellence. COVID-19 rapid guideline: Delivery of radiotherapy. NICE guideline [NG162]. Available at: https://www.nice.org.uk/guidance/NG162. Accessed June 5, 2020.
5. Lewis PJ, Roques TW. The response of the UK clinical oncology community to the COVID-19 pandemic [e-pub ahead of print]. *Clin Oncol (R Coll Radiol).* https://doi.org/10.1016/j.clon.2020.05.007. Accessed June 30, 2020.
6. Scally G, Abbasi K. The UK's public health response to covid-19. *BMJ* 2020;369:m1932.
7. Griffin S. Covid-19: UK deaths approach 50 000, but rate declines. *BMJ* 2020;369:m2212.
8. Thompson MK, Poortmans P, Chalmers AJ, et al. Practice-changing radiation therapy trials for the treatment of cancer: Where are we 150 years after the birth of Marie Curie? *Br J Cancer* 2018;119:389-407.
9. Venables K, Tsang Y, Ciurlionis L, et al. Does participation in clinical trials influence the implementation of new techniques? A look at changing techniques in breast radiotherapy in the UK. *Clin Oncol (R Coll Radiol)* 2012;8:e100-e105.
10. Brunt AM, Haviland JS, Wheatley DA, et al. Hypofractionated breast radiotherapy for 1 week versus 3 weeks (FAST-Forward): 5-year efficacy and late normal tissue effects from a multicentre, non-inferiority, randomised, phase 3 trial. *Lancet* 2020;395:1613-1626.
11. Coles CE, Griffin CL, Kirby AM, et al. Partial-breast radiotherapy after breast conservation surgery for patients with early breast cancer (UK IMPORT LOW trial): 5-year results from a multicentre, randomised, controlled, phase 3, non-inferiority trial. *Lancet* 2017;390:1048-1060.
12. Coles C, Griffin C, Kirby A, et al. Abstract GS4-05: Dose escalated simultaneous integrated boost radiotherapy for women treated by breast conservation surgery for early breast cancer: 3-year adverse effects in the IMPORT HIGH trial (CRUK/06/003). *Cancer Res* 2019;79.
13. Coles CE, Aristei C, Bliss J, et al. International guidelines on radiation therapy for breast cancer during the COVID-19 pandemic. *Clin Oncol (R Coll Radiol)* 2020;32:279-281.
14. Bekelman JE, Sylwestrzak G, Barron J, et al. Uptake and costs of hypofractionated vs conventional whole breast irradiation after breast conserving surgery in the United States, 2008-2013. *JAMA* 2014;312:2542-2550.
15. Prades J, Algara M, Espinàs JA, et al. Understanding variations in the use of hypofractionated radiotherapy and its specific indications for breast cancer: A mixed-methods study. *Radiother Oncol* 2017;123:22-28.
16. Casswell G, Shakir R, Macnair A, et al. UK training in clinical oncology: The trainees' viewpoint. *Clin Oncol* 2018;30:602-604.