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Nurturing a Research-Active Clinical Oncology Workforce: a Trainee Perspective

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Competing interests

CMJ established the National Oncology Trainees Collaborative for Healthcare Research (NOTCH) in 2017 and was Chair of the Trainee Board from 2017-2019. He now leads the Advisory Group. KS was a member of the NOTCH Trainee Board from 2017-2019. Both CMJ and KS are members of the Royal College of Radiologists (RCR) Clinical Oncology Academic Committee, which oversees the RCR Summer Undergraduate Research Fellowship (SURF) programme.

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The past decade saw substantial growth in radiotherapy-related research within the United Kingdom (UK).(1) This welcome increase in activity has been accompanied by considerable development of the UK radiation oncology and radiobiology research landscape. One major example is the establishment in 2019 of a Cancer Research UK (CRUK) Radiotherapy Research Network.(2) The success of initiatives such as this and the continued expansion of the UK radiotherapy research effort are predicated on the availability of an appropriately skilled workforce. However, in recent years the number of clinical oncology consultants who hold research posts has fallen.(3)

In parallel, a frequently occurring theme identified by surveys of registrars and newly appointed consultants is one of fledgling clinical oncologists feeling underprepared to participate in and lead research.(4-8) This was most recently emphasised by the Royal College of Radiologists (RCR) Oncology Registrars Forum annual survey, which in 2018 reported that half of those responding felt that they would benefit from greater research activity.(8) As highlighted by Faivre-Finn, a glass ceiling also undoubtedly persists for women pursuing a career in academic clinical oncology.(9)

Whilst not unique to the UK,(10-12) these challenges emphasise the need to develop a training environment in which all clinical oncologists are enthused and enabled to participate in research. As we reflect here, this will depend not just on providing every trainee with exposure to research or with the space and time to undertake it; but on doing so from the earliest stages of training within an environment rich in incentives, support and mentorship. A roadmap summarising these strategies is provided in **Fig. 1**.

SEEING IS BELIEVING

A first step in ensuring the continued growth of academic clinical oncology in the UK is to ensure both that fledgling academics are attracted to the specialty, and that all clinical oncologists in training are provided with research experience and education. In facilitating academic literacy, such early research exposure confers a number of additional benefits, including improved trainee satisfaction and interest in academia.(13-17) It may also serve to enhance adherence to evidence-based practice, trainee engagement with which is reported to be low in the UK.(18)

Attracting the brightest talent

A majority of doctors receive only very limited exposure to clinical oncology until well into their postgraduate training.(19) As a consequence, medical students and early postgraduate trainees with an interest in and aptitude for academia may look to other specialties for early academic

opportunities. Equally, those who are interested in cancer may choose to pursue medical oncology instead of clinical oncology due to the historical reputation of the former as the more academic specialty. Given that medical oncologists hold an average of 1.96 academic PAs compared with 0.1 PAs for clinical oncologists, this perception is perhaps not unsurprising.(3,20)

It is therefore important that strategies to recruit fledgling clinical researchers focus on enhancing the visibility of academic clinical oncology. In order to compete with other medical specialties, these efforts should be targeted towards medical students as well as trainees. To this end, the RCR Summer Undergraduate Research Fellowship (SURF) scheme, which supports medical students to undertake an eight week period of research in clinical oncology, is to be welcomed.(21) Parallel approaches to support and incentivise pre-specialty trainee doctors such as Academic Foundation Programme (AFP) trainees to undertake projects related to clinical oncology should also be considered. These need not be substantial financial awards. Instead, if appropriately badged and competitively awarded, small pre-doctoral scholarships specific to radiation oncology could serve to attract motivated trainees to, and in turn incentivise them to consider a career in, academic clinical oncology.

Paired with appropriate mentorship and targeted career support, these steps would in theory generate a base from which promising clinical academics could be recruited. For most, National Institute for Health Research (NIHR) Academic Clinical Fellowship (ACF) posts or their equivalents provide an ideal route of entry into academic clinical oncology. However, between 2007-2017 there were a maximum of 45 such ACFs available across 11 centres (E Brown, personal communication, 2018); 34 of which offered entry at Specialty Training (ST) 3 level or above, risking the attrition of junior academics to other 'core' medical specialties offering posts starting at ST1. Many of these ACFs were offered in competition with other specialties, including medical oncology, and as such there were likely far fewer than 45 clinical oncology ACFs appointed over this period. Focus should therefore be applied to increasing the number and geographical spread of these posts (through increasing competitive applications to NIHR for clinical oncology ACF posts), and to either enabling ST1 entry or to providing clinical oncology-focussed research opportunities and training for core medical trainees who have undertaken an AFP but are not yet ready to progress to an ST3-entry ACF.

Immersing trainees in research

Approaches to ensure that all trainees are immersed in research once appointed to clinical oncology should also be considered. Enabling this universal academic exposure would serve to upskill the specialty whilst additionally providing an opportunity to spark academic interest amongst those not

already pursuing integrated academic training (IAT). However, the radiation oncology research landscape is broad, encompassing areas as diverse as technical radiotherapy, basic laboratory work, health services research and clinical trials (**Fig. 2**). In light of this, it may be difficult for trainees naïve to the full breadth of the specialty to find or develop an area of research that matches their interests and expertise. Geographical variation in clinical oncology research activity may further exacerbate this challenge. In a recent exercise, CTRad identified only seven centres as demonstrating emerging or current research excellence, with a similar number contributing to CRUK RadNet.(2,22) Just two of these centres, in Manchester and London, house NHS proton beam therapy (PBT), whilst other new technologies such as MR-Linac are similarly concentrated.(23) There is no doubt that high quality research occurs outside of these foci, but such a concentration of expertise and equipment may cause disparities in the academic opportunities available to trainees across the country. Reflecting these concerns, last year clinical oncology ACFs were concentrated in just six centres.

One route through which early exposure to research may be gained by trainees regardless of their location is through participation in multi-centre trainee-led research projects. Established in 2017, The National Oncology Trainees Collaborative for Healthcare Research (NOTCH) oversees a number of these and provides opportunities for trainees to gain experience participating in, proposing and leading research studies.(24) Trainees may also gain experience by participating in the RCR-endorsed NIHR Associate Principal Investigator (PI) scheme, though opportunities to capitalise on this programme may again vary by centre.(25)

It is of equal importance that higher-level research opportunities, including those related to novel technologies, are made available to trainees regardless of their level of clinical training or their location. Publicising existing opportunities, including through the RCR Trainee Research Network and webpages, social media and via webinars, is a simple but essential first step towards realising this goal. However, training and research stakeholders should also lend considerable focus to enabling trainees to capitalise on research opportunities outside of their region, or even outside of the UK. The provision of financial support is an important consideration in this regard but logistical and administrative support to cater for an individual's personal circumstances, including facilitating distance or working between two regions, is likely to be as beneficial.

Finding the time & space to grow

For the initiatives outlined thus far to equitably succeed, it is important that the clinical oncology curriculum provides dedicated time and incentives for trainees to pursue them. As a craft specialty in

which trainees are already required to complete a number of postgraduate examinations whilst gaining competencies in acute oncology, the use of systemic anti-cancer therapies and the delivery of radiotherapy, necessitating additional research proficiency may be challenging. However, in the absence of embedded research time, academic opportunities may preferentially fall to those able to pursue them outside of normal working hours; an adverse impact of which may be an undesired strengthening of the glass ceiling faced by women in academic clinical oncology. Equally, trainees require not just dedicated time for research, but a supportive training environment in which to undertake it. The importance of Training Programme Directors (TPDs) in establishing this cannot be overstated. On this basis, an 'Academic Training Champion' should be considered as a means to support TPDs to facilitate research training.

For those pursuing higher research training, the requirement to gain an array of clinical competencies alongside considerable research experience presents an additional challenge, as does deciding when to pursue an out-of-programme (OOP) period of research or a higher degree. Ideally, formal OOP activity should be undertaken with sufficient time remaining in clinical training to allow trainees to begin to transition towards research independence. However, for most this means striking a difficult balance between building a research career whilst achieving clinical oncology competencies and progressing through postgraduate examinations. It is clearly important that the same clinical milestones are achieved by all trainees, regardless of their academic intentions. However, considerable emphasis should be placed on competency rather than time-based progression to ensure both that training time is not unduly extended, and that academic work can be afforded equal priority.

Knowledge is key

Where possible, all trainees should have access to formal research teaching in order to contextualise the early and sustained academic exposure advocated here. This would ideally build on existing initiatives, including the statistics and trials training incorporated in the First FRCR programme, and the current requirement for clinical oncology registrars to hold Good Clinical Practice certification. At a local level, centres could be encouraged to deliver a wider programme incorporating formal training in research methods as well as supported journal club analyses of oncology research. Nationally, this could be supported with a series of webinars and by peer-training initiatives such as that planned by NOTCH; research and training stakeholder support for which is to be welcomed. Trainees may be incentivised to pursue both this research and the wider research experience we have advocated using schemes such as the research passport used in Australia and New Zealand.(26,27)

Knowing where to turn

Peer-peer and senior mentorship are crucial for supporting trainees to navigate the complex array of academic pathways outlined here, regardless of their degree of academic ambition.(28) A formal national programme to cultivate mentoring relationships would help reduce inter-centre variation and ensure that all trainees know where to turn for advice on how they might contribute to the growing UK radiotherapy research effort.

At a higher level, it would also be beneficial for centres to support one another with respect to many of the initiatives outlined here. This might include through sharing best practice for securing IAT posts such as ACFs or Academic Clinical Lectureships, through outlining strategies to ensure research projects can be pitched towards more junior trainees or through generating projects that might be shared across centres with access to different resources. As has recently been outlined, support and guidance is also required for trainees who secure advanced post-doctoral funding, such as a Clinician Scientist award.(29)

Inspiring the next generation

The research achievements of the UK clinical oncology community are world-leading.(1,30) Beyond providing the opportunities, time and resources to pursue research training outlined here, the importance of inspiring the next generation of clinical oncologists to build on these strong foundations should not be understated. Whilst individual mentoring relationships are important to this, a coordinated campaign to highlight the potential that each and every trainee has to shape the next decade of radiotherapy research would surely be welcome.

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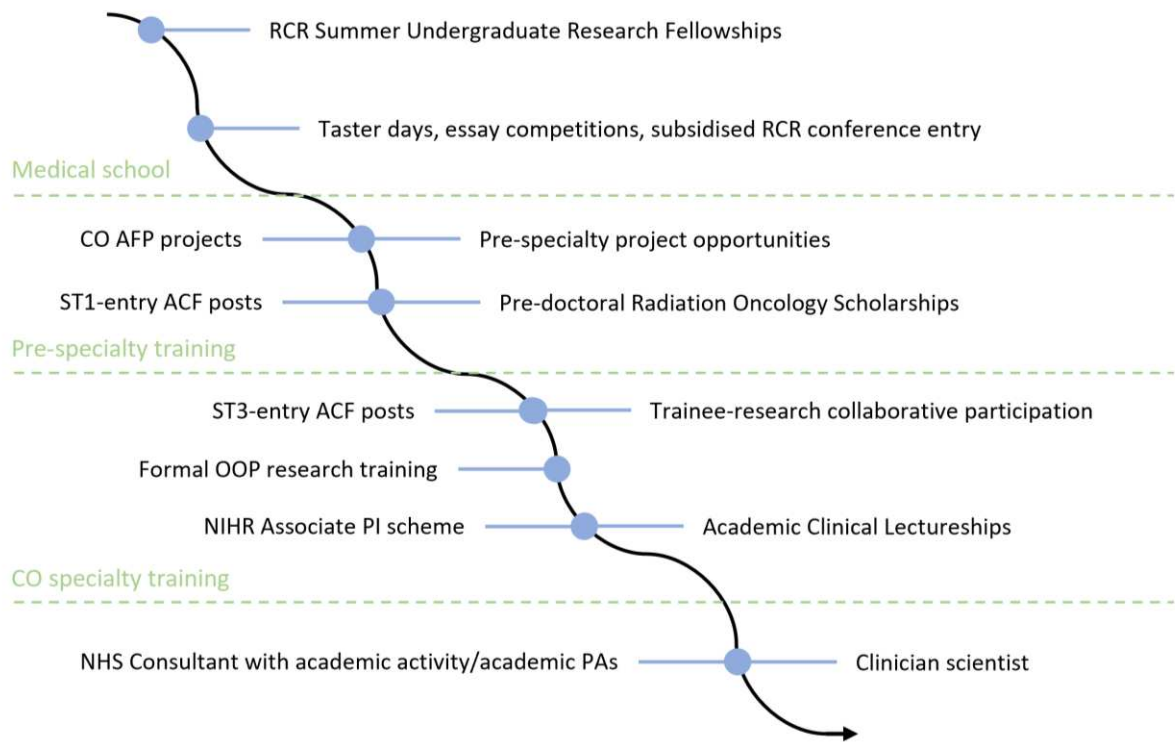


Figure 1: A roadmap illustrating practical steps to nurture research active trainees, by stage of training. AFP: Academic Foundation Programme; NHS: National Health Service; NIHR: National Institute for Health Research; OOP: Out-of-Programme; PI: Principal Investigator; RCR: Royal College of Radiologists; ST: Specialty Training.

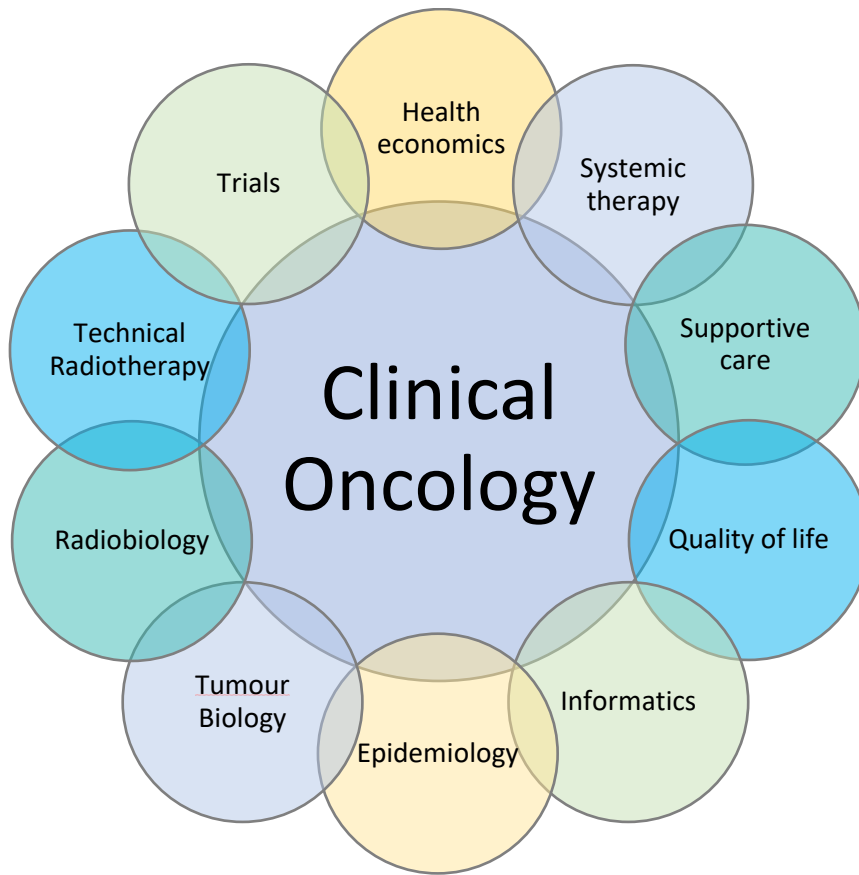


Figure 2: A representation of research areas relevant to clinical oncology.