

Clinical oncology – the future shape of the specialty

Contents

Foreword	3	The research environment	10
Summary	4	Working with other specialties/healthcare sectors	11
1. What is a clinical oncologist?	6	The quality agenda	11
The role of a clinical oncologist	6	4. Where does clinical oncology want to be in ten years' time?	12
Treatments delivered by clinical oncologists	6	Service models	12
Training in clinical oncology	6	Integration of service models and future investment	13
Academic basis for clinical oncology	6	Clinical oncology workforce	13
2. Delivery of a clinical oncology service	8	5. How can clinical oncology achieve specialty development and expansion?	16
Radiotherapy access and service delivery	8	6. The way forward	17
Chemotherapy service delivery	8	References	18
Acute oncology service delivery	9	Appendix 1. Membership of RCR Clinical Oncology Strategy Group	20
3. How is clinical oncology expected to change?	10		
Developments in therapy options	10		
Changes in cancer incidence and demographics	10		

Foreword

The majority of non-surgical oncology treatment in the United Kingdom (UK) is delivered by clinical oncologists. However, the scope of these treatments, their complexity and an increase in the number of patients seeking treatment means that the specialty is dealing with different problems from those faced ten years ago. In addition, the ageing population, with more patients suffering co-morbidities, and the expectation – and aspiration – of clinical oncologists to contribute to research and clinical trials puts additional pressures on the delivery of care. As a specialty, clinical oncology needs to keep up to date with these developments and, from time to time, review the requirements of the patient population and the capabilities of the workforce, thus ensuring the provision of high-quality treatments in accordance with patient views and providing good value to the health service.

In many parts of the world, radiotherapy is delivered by radiation oncologists who, for the most part, do not provide patients with any other form of non-surgical oncology treatment. The UK system is almost unique in that clinical oncologists not only deliver radiotherapy but also deliver systemic therapies in all their different forms. This model of working facilitates co-ordination and continuity of care and efficient and cost-effective service delivery. However, by operating under this system, the UK runs the risk of failing to maintain standards in all the components of the specialty and therefore not providing patients with the most advanced, effective and high-quality treatments.

Against this landscape The Royal College of Radiologists (RCR) felt that it was timely to undertake an in-depth review of clinical oncology as a specialty, to examine current ways of working and see how best it can develop over the next ten years to enhance the scope and quality of non-surgical oncology offered in UK cancer centres.

To undertake this review, a working group was established (June 2013) which had representation from clinical oncologists working in centres of different sizes, dealing with different tumour types – some with a focus on academic oncology – and at different stages of their careers. Members of the working group were assigned to one of four workstreams to address various aspects of clinical oncology as a specialty – training, workforce and job plans; service delivery and access; the research basis for radiotherapy and chemotherapy; and quality for radiotherapy and chemotherapy. Members of the working group are listed in Appendix 1.

This report covers the scope of practice for clinical oncology at the present time and the ways in which clinical oncology services are currently delivered, and indicates how both of these are expected to change over the next ten years. An important part of this is an analysis of the workforce requirements to maintain the service and to allow for delivery of high-quality complex radiotherapy for UK patients. The main findings are highlighted in the summary section.

The RCR is committed to implementing the recommendations of this report, as reflected in its *Strategy for 2014–2016*.¹ Some work is already under way but other actions will require the investment of time and resources which the Clinical Oncology Faculty Board will be asked to recommend to Council. There are enormous opportunities for clinical oncology to ensure that patients with cancer receive the highest standards of treatment delivered by highly skilled specialists.

Dr Diana Tait
Vice-President, Clinical Oncology
The Royal College of Radiologists

Summary

- The prime responsibility of UK clinical oncologists is to ensure delivery of the best possible treatment for patients with cancer within the context of the multidisciplinary cancer team.
- To ensure that patients have access to the best non-surgical cancer care, comparable to that available anywhere in the world, the specialty of clinical oncology must deliver the highest possible standards of radiotherapy and systemic therapy.
- Achieving UK wide excellence in non-surgical cancer care requires all clinical oncologists to integrate therapeutic developments and advances in technology into their clinical practice in a timely manner.
- The elements of clinical oncology practice (see below) that individual clinical oncologists will provide will be determined by their tumour site specialisation and the skill mix within the local multidisciplinary team. Their job plan will reflect the modalities of therapy required to ensure a comprehensive non-surgical oncology service to their patients.
- Clinical oncologists:
 - Will provide radiotherapy and chemoradiotherapy services for patients with cancer in the UK
 - Offer efficient integrated care for patients requiring neo-adjuvant and adjuvant systemic therapy and radiotherapy
 - May deliver a full range of systemic therapies (cytotoxic chemotherapy, biological and endocrine therapies and molecular radiotherapy) for solid tumours
 - Will manage the side effects of all treatment delivered by the specialty
 - Will continue to have all of the required competencies to deliver an acute oncology service
 - Offer cost-effective non-surgical oncology treatment throughout the care pathway for patients with cancer.
- To achieve the required standards of care it is recommended that clinical oncologists specialise in no more than two major tumour sites.
- To deliver continued improvement in non-surgical oncological care, the clinical oncology academic profile must reflect all facets of the specialty's areas of clinical practice.
- Clinical oncologists are the only specialist physicians trained in the assessment of patients for radiotherapy and in its delivery, either alone or in conjunction with other anticancer treatments. They therefore have the responsibility for ensuring that all UK patients have access to the highest standards of radiotherapy.
- As the unique provider of radiotherapy services, clinical oncology must prioritise radiotherapy research and development, from basic science to translational and applied clinical research.
- Training, out of programme research, provision of clinical scientist posts and other academic opportunities and support should reflect the high priority given to excellence in radiotherapy.
- Clinical oncology specialist training needs to remain broad-based to ensure flexibility to accommodate developments in healthcare, enable uptake of research advances and to provide the care needed at the local service level.
- Trainees must have increasing opportunities to undertake out of programme research and experience to ensure the continued development of the specialty as a whole.
- The current clinical oncology workforce is insufficient to meet present and future service demands. Increasing cancer incidence, prevalence and treatment complexity necessitate an increase in the clinical oncology workforce.

- Clinical oncology has a long history of effective skillmix working with other professions but escalation of this alone will not address the increasing clinical oncology workload.
- Appropriate development of the clinical oncology workforce will:
 - Deliver a high-quality service that is both clinically and cost-effective
 - Ensure delivery of patient-centred cancer care
 - Facilitate delivery of radiotherapy to the highest international standards, resulting in improved survival and reduced morbidity for patients
 - Ensure patients have access to a range of treatment options to maximise length and quality of life
 - Provide flexibility in service delivery.
- The RCR is committed to:
 - Ensuring that high-quality non-surgical cancer treatment is available to all patients across the UK
 - Ensuring that radiotherapy access, development and research is a priority in cancer care in the UK, such that the UK can lead international treatment quality standards
 - Training clinical oncologists who are able to deliver the best patient care in different models of cancer service provision
 - Supporting clinical oncologists in delivering the highest standards of clinical practice, including timely implementation of treatment developments
 - Working with partner organisations to facilitate cancer research, particularly in relation to radiotherapy.

1. What is a clinical oncologist?

The role of a clinical oncologist

Although clinical oncologists are the only clinicians trained in the assessment of patients for and treatment of patients with radiotherapy, the majority of clinical oncologists deliver both systemic therapy and radiotherapy. Each clinical oncologist specialises in the management of specific types of tumour and this will determine the treatments they deliver.

Clinical oncologists are pivotal in delivering non-surgical oncological care. They are core members of all solid tumour multidisciplinary teams and are able to manage patients throughout their non-surgical cancer treatment. Clinical oncologists are ideally placed to deliver acute oncology services and to manage the seamless integration of systemic therapy and radiotherapy in patient care in a highly cost-effective model.²

The majority of clinical oncologists are active in clinical trials, both in radiotherapy practice and systemic therapy. Some clinical oncologists follow academic careers where their unique contribution is in the development of the understanding of the underlying biological process and determinants of response to radiotherapy and the testing of new approaches to improve treatment outcomes.

By the nature of their spectrum of activity, clinical oncologists provide a unique holistic view of cancer care and a workforce that is expert, flexible and cost-effective.

Treatments delivered by clinical oncologists

Radiotherapy may be delivered using external beam therapy (EBRT), brachytherapy (where a radioactive source is placed close to the tumour) or molecular radiotherapy (use of injected or ingested radioisotopes) depending on the clinical situation. Systemic therapies include chemotherapy, endocrine therapy and targeted biological therapies (such as antibodies, small molecules and immunotherapy). Systemic therapy and radiotherapy may be used separately, sequentially or concomitantly (chemoradiotherapy) depending on the clinical situation.

Appropriate access to and optimum use of radiotherapy is essential as it is the most clinically and cost effective non-surgical treatment available to patients with cancer. Treatment with radiotherapy contributes to the cure of 40% of cancer patients, whereas systemic therapy contributes to the cure of 10% of cancer patients.³ Radiotherapy, as the sole treatment modality, cures 16% of patients. In addition to providing a cure, radiotherapy improves quality of life through rapid, effective symptom control. Radiotherapy accounted for 5% of the national spend on cancer treatments in England in 2012.⁴

Training in clinical oncology

Clinical oncology trainees complete two years of core medical training and five years of clinical oncology training. The first 3–3.5 years of clinical oncology training cover all tumour sites and include a course covering the sciences that underpin cancer therapy. This ensures good general medical and oncology training in all areas of solid tumour oncology. In the final 1.5–2 years, while consolidating their understanding of cancer treatment and developing their skills in technical radiotherapy, management and leadership, trainees also develop advanced competencies in a minimum of two tumour sites.

The combination of generalist and specialist training delivers a flexible workforce. This grounding in general medicine and oncology followed by tumour site specialisation ensures that clinical oncologists are able to support patients with co-morbidities and acute oncological problems while still delivering the tumour site specialist care required to ensure optimal management for individual patients.

Academic basis for clinical oncology

Radiotherapy research

Radiotherapy research is having a revival in the UK. UK randomised clinical trials, including START, RT01, PR07 and BC2001, have recently produced practice-changing data published in high-impact journals.^{5–8} However, radiotherapy research in the UK in some of the emerging research fields is lagging behind other developed nations.

The Clinical and Translational Radiotherapy Research Working Group (CTRad) was established by the National Cancer Research Institute (NCRI) in 2009 and has a broad remit to improve radiotherapy research and development throughout the UK. Since the initiation of CTRad, the number of patients recruited into radiotherapy trials across the UK has more than doubled to almost 7,000 in 2012/13.⁹

CTRad has identified three established UK centres of excellence in radiation research – The Royal Marsden, The Christie NHS Foundation Trust and The Oxford Institute for Radiation Oncology. There are a small number of centres with the potential to become centres of excellence in the near future and a further number of centres which have one or two of the elements required to perform high-quality research.

There has been an increase in the number of academic clinical oncologists. There are currently over twenty Chairs in clinical oncology. The key emerging areas of clinical radiation research are:

- Innovative radiation treatment delivery/modalities, for example stereotactic ablative radiotherapy (SABR) and proton therapy
- Image-guided radiotherapy (biological adaptation)
- Radiotherapy-drug combinations
- Radiotherapy immunomodulation
- Radiotherapy biomarkers: imaging/omics
- Molecular radiotherapy.

While 15% of clinical oncology trainees undertake out of programme research leading to completion of

an MD or PhD, this proportion is low when compared to medical oncology where around 75% take this opportunity.¹⁰ There may be a number of reasons for this, including an emphasis on the Fellowship of the Royal College of Radiologists (FRCR) exam process in training, scarcity of funding opportunities and expectations within the specialty. In the coming decade, it is hoped that a growing proportion of trainees will take the opportunity to conduct full-time research to equip them to lead and prepare them for the ever-changing nature of the specialty.

Systemic therapy research

Research in systemic therapies is the natural focus of medical oncologists. While some clinical oncologists have had success in leading trials in systemic therapy and some have moved totally into the systemic therapy arena and lead programme grants, this is the exception. However, many clinical oncologists participate in systemic therapy trials and, as a specialty, clinical oncology contributes a large number of patients to NCRI chemotherapy trials.

In the next ten years, with the increasing awareness of tumour heterogeneity and the ever-expanding complexity of novel targeted therapies and combinations of therapies, systemic therapies will undergo profound change. The arena of chemoradiation offers an ideal opportunity for clinical oncologists to become involved in chemotherapy and novel agent research based on the increasing understanding of predictors of response to radiation. While it will be increasingly difficult for clinical oncologists to be successful as research leaders in systemic therapy *per se*, this may remain a particular focus of a few clinical oncologists.

2. Delivery of a clinical oncology service

Radiotherapy access and service delivery

Radiotherapy

Access to radiotherapy in the UK is lower than predicted by modelling.¹¹ The Malthus model suggests an appropriate radiotherapy access rate of 40.6% (40.6% of patients with cancer should receive radiotherapy).¹² This equates to 48,000 fractions of radiotherapy per million population per year. Although this model has yet to be validated and assumptions may need to change as new data emerge, from data so far in 2014 it appears that the average for the year will be in the order of 35,700 fractions of radiotherapy per million population.¹³ The National Radiotherapy Advisory Group (NRAG) recommended that 306 radiotherapy treatment machines should be in clinical use in England by 2011 but the Radiotherapy Dataset (RTDS) shows this figure is only 265 machines at present.⁴ Annual growth in activity is less than 3% per year, suggesting persisting under-utilisation of radiotherapy for UK patients. Furthermore, the RTDS demonstrates considerable variation in radiotherapy activity across the country, with less use of radiotherapy in remote and relatively socially deprived populations and in elderly patients.

Advanced radiotherapy

Intensity-modulated radiotherapy (IMRT), proton therapy, 4D-adaptive radiotherapy, image-guided brachytherapy and stereotactic radiotherapy (SRT) increase the therapeutic ratio and improve the accuracy of radiotherapy resulting in better patient outcomes. However, advanced radiotherapy requires increased clinical oncologist, radiographer and medical physics resources and additional capital expenditure to ensure access to modern linear accelerators. Uptake of IMRT has been relatively slow in the UK but is now increasing.¹⁴

Current advanced radiotherapy techniques will continue to evolve and develop, and it is essential for patient care that clinical oncologists have time to implement and make the best use of these.

To ensure that all appropriate patients have access to advanced radiotherapy techniques, and to make up for the historical shortfall, there must be adequate provision in clinical oncologists' job plans to allow for the the expansion in radiotherapy planning time (to allow definition of radiotherapy treatment volumes, review of radiotherapy treatment plans and verify accurate delivery of treatment).

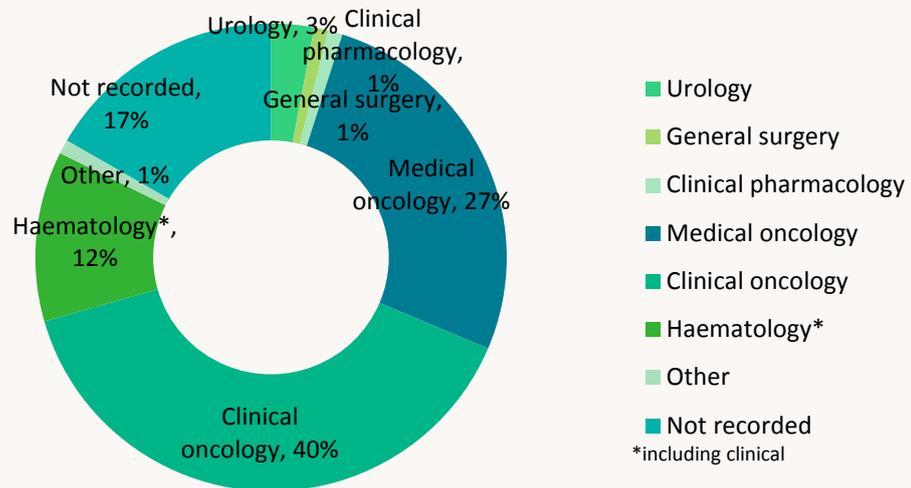
In summary, there is inequality in access to radiotherapy and quality of care for patients receiving radiotherapy across the UK. To enable the UK to meet international access standards and deliver better patient outcomes, it is necessary to accelerate the expansion of access to radiotherapy.¹⁵ Greater investment is required to ensure uniformly high-quality radiotherapy provision across the UK.

Chemotherapy service delivery

As a specialty, clinical oncology prescribes the greatest proportion of systemic anticancer therapy in the UK (Figure 1).¹⁶ The *RCR Clinical Oncology Workforce Census Report* found that 85% of consultant clinical oncologists are responsible for delivering both systemic therapy and radiotherapy.¹⁷

Accurate national data on chemotherapy activity have recently become available through the development of the Systemic Anti-Cancer Therapy (SACT) Dataset.¹⁶ Systemic anticancer therapy workload is increasing by 8% per year.¹⁶ This rapid growth in the use of systemic therapy contrasts markedly with the slower growth in radiotherapy usage, which is less than 3% per year. With the emergence of new therapeutic agents and the development of individualised patient treatment regimes based on the biological characteristics of their tumour, the increase in systemic therapy is likely to continue. However, financial constraints and recognition of limited benefits may eventually curtail this.

Figure 1. Proportion of chemotherapy delivered to patients aged 16 or over by consultant specialty group¹⁷



Acute oncology service delivery

The concept of acute oncology was initially developed in response to the National Chemotherapy Advisory Group (NCAG) report which outlined concerns about the management of patients with neutropenic sepsis after chemotherapy.¹⁸ However, as acute oncology teams have developed it has become clear that much of their work centres around the management of patients with symptoms due to the progression of their cancer. The National Peer Review Measures for acute oncology recommend a team including a consultant medical oncologist, clinical oncologist or

haemato-oncologist, but do not detail the competencies required.¹⁹ Clinical oncologists with expertise in managing the side effects of chemotherapy and radiotherapy, the management of spinal cord compression and patients with carcinoma of unknown primary origin, have the skills to be key members of the acute oncology team. As much of the work of acute oncology relates to cancer progression and its consequent symptoms, palliative care is also a core specialty in delivering an acute oncology service.

3. How is clinical oncology expected to change?

Developments in therapy options

There will be major changes in therapy options over the next ten years and the key influences on clinical oncology as a specialty are likely to focus on the following:

- Advanced radiotherapy techniques, such as IMRT and image-guided radiotherapy (IGRT) offer patients the possibility of improved chances of cure whilst minimising the side effects of treatment, thus improving the duration and quality of life. The use of these techniques will continue to evolve and newer technology will be utilised to improve patient outcomes further (for example, 4D adaptive radiotherapy). Historically, every improvement in technical radiotherapy has required greater clinician input in terms of radiotherapy planning time. The time required for clinical oncologists to plan IMRT for a patient can be up to 2–3 times greater than that required to plan conformal radiotherapy (the previous gold standard for radiotherapy planning).
- The proton therapy centres being established in the UK will be staffed by clinical oncologists who will have expertise in selection of patients and in proton beam treatment planning and follow up. The challenges of delivering this highly technical treatment for complex patients (paediatric, neuro-oncology and sarcomas in the first instance) will be significant. Research in newer applications of proton beam therapy will be an important new research focus.
- The increase in systemic therapy options means that treatment is available to more patients and that more lines of treatment are offered to individual patients.
- Molecular radiotherapy options are also likely to increase. For example, Radium 223 has recently been licensed for use in advanced prostate cancer. This is the first treatment of this type to show an increase in survival in metastatic prostate cancer.
- Technological developments in genomics will increase the opportunity to deliver personalised medicine. Advances in personalised medicine will increase the workload for clinical oncologists. However, this should improve

patients' quality of life and bring economic benefits as treatments can be used more selectively for patients who are most likely to benefit from a specific therapeutic intervention.

- Developments in imaging techniques and their incorporation into all aspects of oncology, but with particular influence on radiotherapy planning, will require clinical oncologists to integrate additional information into their clinical practice.

These increased treatment options, alongside increasing public expectation and awareness will necessitate clinical oncologists having the time to explain the relevant options to facilitate patients' decision making.

Changes in cancer incidence and demographics

- The incidence of cancer is expected to increase in the next decade.²⁰
- The greatest increase in cancer diagnoses will be in the ageing population. This group of patients tends to have more complex medical problems due to co-morbidities.
- Early diagnosis of cancer, through screening initiatives and increased public awareness, will increase the workload for clinical oncologists as more patients will be amenable to radical, potentially curative treatment with radiotherapy or chemoradiotherapy.

The research environment

In 2012, one-in-five of all UK cancer patients were participating in research.²¹ Discussing trials and ensuring that patients have all of the required information to give informed consent for entry to clinical trials takes extra time when compared to discussing accepted treatment options.

- From the radiotherapy research perspective, the UK should aim to recover international competitiveness, even leadership, within the next ten years. This must be built on a strong scientific basis, with in-depth investigation of the key areas of related biology (deoxyribonucleic acid [DNA] repair tumour microenvironment,

immunology, epithelial cell biology, normal tissue radiosensitivity). There needs to be a major focus on determinants of predictive biomarker response to radiotherapy to enable selection of the right patients for the right treatment. There also needs to be greater engagement of scientifically trained clinical oncologists in basic and translational research, in the context of a funding environment that recognises and prioritises optimisation of radiotherapy as a key aspect of curative cancer treatment.

- The research component of all clinical oncologists' workloads will increase and needs to be reflected in job plans, as does the time required for implementing new technical developments in radiotherapy.
- Academic career opportunities will increase and expansion in the number of clinical scientist posts will allow trainees to remain clinically competent and involved with patients while leading on major research programmes.

Working with other specialties/healthcare sectors

- Clinical oncologists will need to work more closely with primary care physicians. This will be necessary to ensure that:
 - Patients' co-morbidities are managed appropriately during treatment and that any side effects of treatment and psychosocial needs are addressed, both during treatment and in the long-term
 - Cancer survivors receive appropriate care and support. It is estimated that the number of cancer survivors will increase by 3% per year. Estimates for 2008 indicated that there were 2 million cancer survivors in the UK.²²
- Clinical oncologists will continue to work with other medical and surgical specialties that

deliver care to cancer patients. There is a degree of common ground between the services provided by these specialties. Clinical oncology needs to recognise where it can make the greatest contribution, depending on tumour site and local service arrangements, and work alongside other specialties to achieve this.

- Other healthcare professionals, such as therapy radiographers, specialist nurses and medical physicists work very closely with clinical oncologists and role development, with skillmix, has strengthened the service. Constant review of ways to optimise multidisciplinary working will see changing models of care delivery.

The quality agenda

Radiotherapy and chemotherapy have both been subject to a peer review system for the past ten years.²³ Most treatment services also sign up to other quality systems such as ISO 9001 or the CHKS Oncology Services Accreditation Programme.^{24,25} None of these systems is perfect but they will remain and are likely to be enhanced so that clinical oncologists will need to demonstrate competence in delivering treatments for which they have clinical responsibilities. Complying with these systems and demonstrating compliance will place an additional demand on clinical oncologists' time.

The role of regular peer review of radiotherapy planning is recognised internationally as being important in ensuring that patients receive consistent, safe, high-quality treatment. Ideally, all clinical oncologists should take part in regular radiotherapy planning quality assurance meetings with their peers. To avoid delays in treatment, these meetings should take place on a weekly basis. At present, the majority of clinical oncologists are unable to participate in such meetings due to lack of time in their job plans. It is estimated that, on average, clinical oncologists require an extra 0.25 programmed activities (PAs) per week to deliver radiotherapy quality assurance.

4. Where does clinical oncology want to be in ten years' time?

Service models

Clinical oncologists in the UK undergo broad-based training in non-surgical oncology and the range of treatments that any individual clinical oncologist delivers to patients depends on their tumour type specialisation and local service arrangements. This comprehensive training equips a flexible workforce, both in terms of potential models of service delivery and the ability for clinical oncologists to adapt their practice at different stages of their career depending on the needs of the patient population.

Clinical oncology practice can be considered under three models which mainly vary in the scope of non-surgical oncology that is undertaken. The comprehensive nature of clinical oncology training and the flexibility in service delivery means that there is no single specification for how a clinical oncology service should be designed or how an individual clinical oncologists should work. The models outlined below can coexist in the same department and an individual oncologist may work in different models for different tumour type specialisations at the same time, or may progress through different models at different stages in their career.

Complete clinical oncology model

Through their broad-based training, clinical oncologists have the ability to deliver a range of non-surgical options, offer patients access to a wide range of treatment options and provide continuity of care for patients. Under the care of a single oncology team, patients receive an efficient, effective service which provides the National Health Service (NHS) with value for money. However, as indicated in the preceding sections, this brings challenges to the clinical oncology workforce in terms of workload pressures and the need to maintain a broad high-quality skill base. These workload pressures may have contributed to the delay in bringing modern, safer and less toxic radiotherapy treatments to

the UK. As outlined in Section 3, these challenges will only intensify as therapy options increase. The current clinical oncology model can therefore only be maintained effectively with an increase in workforce, a review of ways of working, an investment in equipment, expansion in research and demonstration of quality. The complete oncology model is in line with the themes emerging for training and models for service delivery which describe a greater role for generalism rather than specialisation.²⁶

Modified clinical oncology model

Recognition of the increasing complexity of both radiotherapy and systemic therapy, and the workload that each of these entails, raises the need to consider partnership working with colleagues in other specialties. This model allows some clinical oncologists to focus their roles around the delivery of radiotherapy, either as a sole modality or with the integration of existing or novel systemic therapies. The degree to which each of these approaches is required varies with site specialisation. This model reduces time spent on systemic therapy delivery, particularly in the palliative and adjuvant settings, and favours the development of technical radiotherapy. It allows the clinical oncologist to balance the drug/radiation prescription intensity and to monitor/manage the toxicity of either treatment component.

Radiation oncology model

The third model of delivery is for the clinical oncologist to practice as a pure 'radiation oncologist', a model that is followed in some parts of the world. This model allows professional focus on technical radiotherapy, permits greater time for radiotherapy planning and may stimulate more radiotherapy research. In this model, the radiation oncologist is not involved with giving any other form of non-surgical oncology treatment or in the overall management of patients. This results in radiotherapy being very much a technical service. Radiation oncology is the model that has been in operation in the

United States of America (USA) and its limitation of scope of practice have led to other specialties developing the skills to deliver radiation in a very circumscribed clinical setting with a narrow range of techniques employed, as in, for example, prostate brachytherapy and intraoperative breast radiotherapy.²⁷ Such fragmentation of radiotherapy delivery risks patients being denied access to the full range of potentially beneficial treatment options.

Integration of service models and future investment

UK clinical oncologists currently work within each of the models outlined above but the vast majority work within the first model (complete clinical oncology) and are responsible for systemic therapy as well as radiotherapy. A very much smaller proportion work in the second model (modified clinical oncology) and even fewer clinical oncologists work in the third model (radiation oncology). In order to advance technical radiotherapy in the UK, there will need to be more clinical oncologists whose focus is radiotherapy, both in academic and service settings, which means some increase in models two and three. However, clinical oncologists working in this way must integrate closely with those working as complete oncologists so that patients continue to be offered radiotherapy appropriately and so that advances in radiotherapy are introduced promptly across all radiotherapy departments.

Delivering modern high-quality radiotherapy must continue to be a core activity of all clinical oncologists. The impact of the Radiotherapy Innovation Fund on changing radiotherapy practice demonstrates the capability of the specialty to deliver this, provided the appropriate facilities and support are in place.

There needs to be a significant increase in investment in both the technology and the clinical oncology workforce to accommodate the predicted change in both the nature and volume of workload (see Section 3).

Recognition of the importance of radiotherapy as a key curative cancer treatment modality should ensure that commissioners continue to invest in

the service. Radiotherapy is cost-effective. The current number of linear accelerators and the replacement programme requires ongoing and increasing capital investment.

The clinical oncology practice models outlined in this section will continue to exist, with the most commonly applied model being that of 'complete clinical oncology'. The drive for the specialty to improve access to, and availability and quality of technical radiotherapy must be accompanied by the ability of the specialty to continue to serve patients with high-quality treatment in all aspects of non-surgical oncology.

Clinical oncology workforce

There are currently 749 (headcount) consultant clinical oncologists in substantive posts in the UK and this translates into 691 whole time equivalent (WTE) consultants.²⁸ There are 376 UK trainees in clinical oncology and the average duration of clinical oncology training is six and a half years.⁹

A detailed analysis of the current and anticipated clinical oncology workforce has been undertaken.²⁹ Information has been collated on all trainees completing training in the last five years, trainees expected to complete training and expected consultant retirements in the next five years, and the increasing trend to less than full time working. This information has been used to predict the number of clinical oncology consultants in the next five years (Figures 2 and 3 [overleaf]).

It is essential that all clinical oncologists have time in their job plans for radiotherapy planning to ensure that patients have access to high-quality up to date radiotherapy. The clinical oncology workforce has incorporated the increased time required for planning and delivering advanced radiotherapy within their current contracts, either by working longer hours with no remuneration or by reducing their supporting professional activity (SPA) time. To address this, it is estimated that, on average, each consultant clinical oncologist requires an extra 0.5 PAs in their job plan to ensure that all patients have access to the best possible radiotherapy.

Radiotherapy planning quality assurance requires clinical oncologists to take part in regular meetings where their radiotherapy plans are reviewed by peers. On average, each clinical oncologist requires an additional 0.25 PAs per week to allow them to undertake weekly radiotherapy planning reviews.

It is anticipated that the clinical oncology workload will increase by 9% (systemic therapy plus radiotherapy increase) per annum.

Figure 2 below demonstrates the shortfall in clinical oncologists over the next five years,

modelled with allowance of an additional 0.75 PAs per week per consultant to deliver advanced radiotherapy.

On this basis, to fully meet the needs of the service, it is anticipated that an extra 362 clinical oncology consultants (WTEs) will be needed. Taking into account estimated trainee attrition and an estimated participation rate of 0.95 (ie on average 95% of clinical oncology consultants will work full time), 93 clinical oncology trainees (headcount) would be required per year for the next five years to close this gap.

Figure 2. Clinical oncology consultant workforce and workload forecast, UK, to 2018

(With 0.75 additional PA time per week for advanced radiotherapy planning)

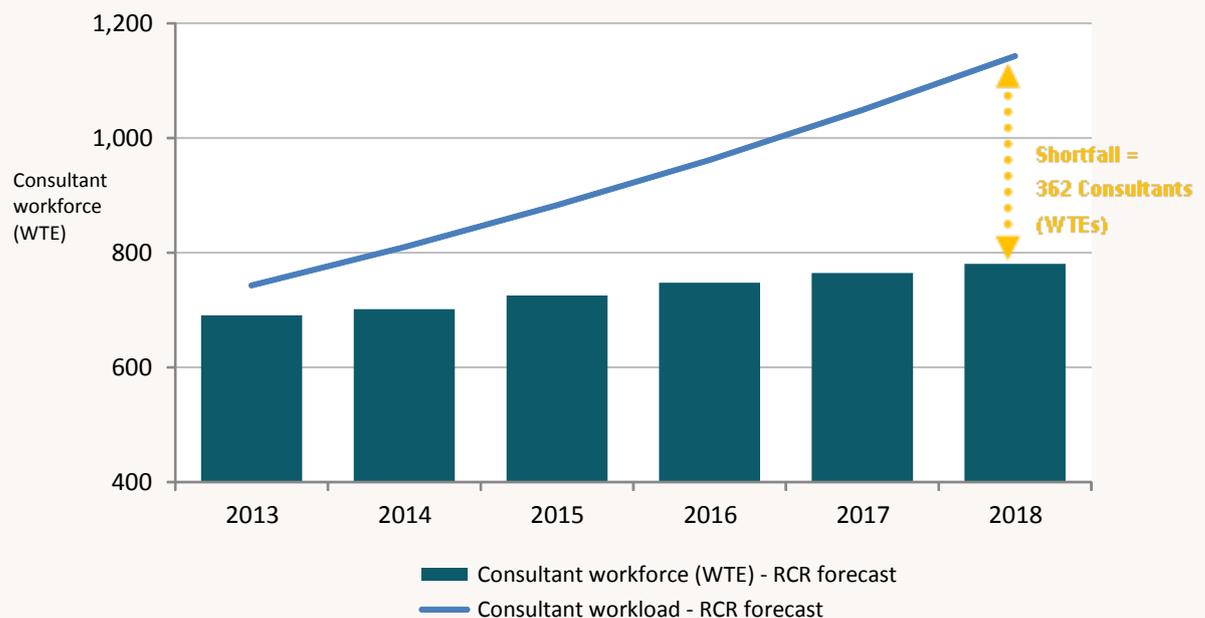


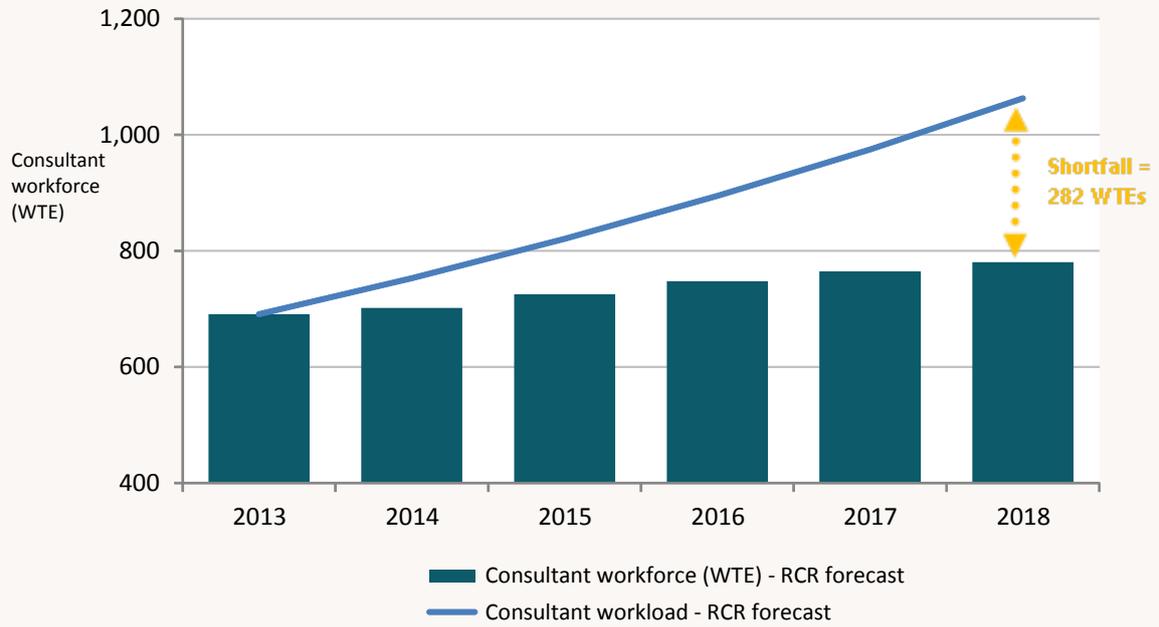
Figure 3 demonstrates the shortfall in clinical oncologists over the next 5 years, modelled *without* allowance of an additional 0.75 PAs per week per consultant to deliver advanced radiotherapy.

On this basis, to fully meet the needs of the service, it is anticipated that an extra 282 clinical

oncology consultants (WTEs) will be needed. Taking into account estimated trainee attrition and an estimated participation rate of 0.95, 73 clinical oncology trainees (headcount) would be required per year for the next five years to close this gap.

Figure 3. Clinical oncology consultant workforce and workload forecast, UK, to 2018

(Without additional PA time for advanced radiotherapy planning)



5. How can clinical oncology achieve specialty development and expansion?

The workforce predictions shown above and in the RCR's *Clinical Oncology Workforce: the case for expansion* form part of a submission to Health Education England (HEE) making the case for significant expansion of clinical oncology in order to meet the forecast workload going forward.²⁹

These figures cover the next five years (to 2018) but these predictions will need to be updated yearly and extended to give a ten-year perspective, bearing in mind the time needed for completion of training and to support the continued expansion in workload.

In addition, the RCR will need to enlist support from the Department of Health, NHS England, commissioners of radiotherapy and chemotherapy and equivalent bodies in the UK devolved nations to ensure a commitment to funding the additional posts and capital expenditure needed to ensure a fit-for-purpose clinical oncology service for the future.

Alongside plans for expansion, the RCR must enhance recommendations in terms of job

planning, as outlined earlier, but relating in particular to supporting professional activities (SPA) allowance, time needed for radiotherapy planning and the number of site specialties covered by individual clinical oncologists. The RCR must also be more active in promoting radiotherapy research, working with CTRad and supporting Fellows and members in research at all stages of their careers.

Clinical oncology training must continue to ensure that, on completion, trainees have the competencies to meet the demands of the service. The training must provide a workforce that is flexible and able to offer holistic patient care. This will best be delivered by a combination of general medical and oncology training followed by a period of tumour site specialisation. While the current training model will – and should continue to – evolve with regular review of the curriculum, there is no clear reason why it should be drastically changed at present.

6. The way forward

Cancer services in the UK should continue to be delivered by a multidisciplinary team. Clinical oncology delivers both radiotherapy and chemotherapy very effectively and should continue to do so for most tumour types.

The competencies required by clinicians to plan and prescribe modern radical radiotherapy are acquired during advanced radiotherapy training in the 18–24 months before completion of specialist training. These are therefore not roles that could be devolved to other ‘trained doctors’ or other staff.

Clinical oncologists should continue to deliver holistic cancer care but there may need to be a greater degree of specialisation. The majority of clinical oncologists will continue to deliver tumour

site specialist care which will involve delivery of systemic therapy and radiotherapy, often in the combined modality setting. The proportion of the clinical oncologists’ job plan devoted to systemic therapy or radiotherapy will be dependent on the treatment options for patients with the tumour site in which they are specialising. There will be a smaller proportion of clinical oncologists who will specialise in specific areas of practice – for example, specialist radiation oncologists who will be able to devote time to developing, implementing and wider uptake of advances in radiotherapy delivery.

Approved by the Clinical Oncology Faculty Board: 17 October 2014.

References

1. The Royal College of Radiologists. *Strategy 2014–2016*. London: The Royal College of Radiologists, 2014.
2. The Royal College of Radiologists. *The role of clinical oncologists in acute oncology services* (position statement). London: The Royal College of Radiologists, 2011.
3. Bentzen SM, Heeren G, Cottier B, Slotman B, Glimelius B, Lievens Y, van den Bogaert W. Towards evidence-based guidelines for radiotherapy infrastructure and staffing needs in Europe: the ESTRO QUARTS project. *Radiother Oncol* 2005; **75**(3): 355–365.
4. Department of Health. *Radiotherapy services in England 2012*. London: Department of Health, 2012.
5. START Trialists' Group. The UK Standardisation of Breast Radiotherapy (START) Trial A of radiotherapy hypofractionation for treatment of early breast cancer: a randomised trial. *Lancet Oncol* 2008; **9**(4): 331–341.
6. Dearnaley DP, Sydes MR, Graham JD *et al*. Escalated-dose versus standard-dose conformal radiotherapy in prostate cancer: first results from the MRC RT01 randomised controlled trial. *Lancet Oncol* 2007; **8**(6): 475–487.
7. www.ctu.mrc.ac.uk/our_research/research_areas/cancer/studies/pr07/ (last accessed 17/12/2014)
8. Huddart RA, Hall E, Hussain SA *et al*. Randomized noninferiority trial of reduced high-dose volume versus standard volume radiation therapy for muscle-invasive bladder cancer: results of the bc2001 trial (CRUK/01/004). *Int J Radiat Oncol Biol Phys* 2013; **87**(2): 261–269.
9. National Cancer Research Institute. *CTRad: national leadership in radiotherapy research – Achievements and vision*. London: National Cancer Research Institute, 2014.
10. Personal communication 2014. The Royal College of Radiologists, London.
11. National Radiotherapy Advisory Group. *Radiotherapy: developing a world class service for England. Report to Ministers from National Radiotherapy Advisory Group*. London: National Radiotherapy Advisory Group, 2007.
12. <http://camradiotherapy.org.uk/malthus> (last accessed 15/12/2014)
13. www.natcansat.nhs.uk/rt/rtds.aspx (last accessed 15/12/2014)
14. Cancer Research UK. *The Radiotherapy Innovation Fund. An evaluation of the Prime Minister's £23 million fund*. London: Cancer Research UK, 2013.
15. www.estro.org/binaries/content/assets/estro/about/hero/cancerworld.pdf (last accessed 15/12/2014)
16. www.chemodataset.nhs.uk/home (last accessed 15/12/2014)
17. The Royal College of Radiologists. *Clinical Oncology UK Workforce Census Report 2012*. London: The Royal College of Radiologists, 2013.
18. National Cancer Advisory Group. *Chemotherapy Services in England: Ensuring Quality and Safety. A report from the National Chemotherapy Advisory Group*. London: Department of Health, 2009.
19. [/www.cquins.nhs.uk/?menu=resources](http://www.cquins.nhs.uk/?menu=resources) (last accessed 15/12/2014)

20. Mistry M, Parkin DM, Ahmad AS, Sasieni P. Cancer incidence in the United Kingdom: projections to the year 2030. *Br J Cancer* 2011; **105**(11): 1795–1803.
21. National Cancer Research Institute. *NCRI Clinical Studies Groups: A prospectus*. London: National Cancer Research Institute, 2013.
22. www.ncin.org.uk?view?rid=70 (last accessed 15/12/2014)
23. Department of Health. *Cancer Reform Strategy*. London: Department of Health, 2007.
24. www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=46486 (last accessed 15/12/2014)
25. www.chks.co.uk/home (last accessed 15/12/2014)
26. Shape of Training. *Shape of Training: securing the future of excellent patient care. Final report of the independent review led by David Greenaway*. London: Shape of Training, 2013.
27. Zietman A. The future of radiation oncology: the evolution, diversification and survival of the specialty. *Semin Radiat Oncol* 2008; **18**(3): 201–213.
28. The Royal College of Radiologists. *Clinical oncology UK workforce census report 2013*. London: The Royal College of Radiologists, 2014.
29. The Royal College of Radiologists. *Clinical oncology workforce: the case for expansion*. London: The Royal College of Radiologists, 2014.

Appendix 1. Membership of RCR Clinical Oncology Strategy Group

Dr Diana Tait – Chair
Professor David Dodwell
Dr Kevin Franks
Dr Di Gilson
Professor Peter Hoskin
Dr Peter Kirkbride
Professor Tim Maughan
Mr Tony Murphy (lay member)
Dr Paddy Niblock
Professor Joe O’Sullivan
Dr Martin Rolles
Dr Tom Roques
Dr Daniel Saunders
Dr Nicky Thorp
Dr Charles Wilson
Dr David Woolf (trainee representative)

Citation details

The Royal College of Radiologists. *Clinical oncology – the future shape of the specialty*. London: The Royal College of Radiologists, 2014.

Ref No. BFCO(14)4

© The Royal College of Radiologists,
December 2014.

For permission to reproduce any of the content contained herein, please email:
permissions@rcr.ac.uk

This material has been produced by The Royal College of Radiologists (RCR) for use internally within the specialties of clinical oncology and clinical radiology in the United Kingdom. It is provided for use by appropriately qualified professionals, and the making of any decision regarding the applicability and suitability of the material in any particular circumstance is subject to the user's professional judgement.

While every reasonable care has been taken to ensure the accuracy of the material, RCR cannot accept any responsibility for any action taken, or not taken, on the basis of it. As publisher, RCR shall not be liable to any person for any loss or damage, which may arise from the use of any of the material. The RCR does not exclude or limit liability for death or personal injury to the extent only that the same arises as a result of the negligence of RCR, its employees, Officers, members and Fellows, or any other person contributing to the formulation of the material.

The Royal College of Radiologists
63 Lincoln's Inn Fields, London WC2A 3JW
Tel: +44 (0)20 7405 1282
Email: enquiries@rcr.ac.uk www.rcr.ac.uk



A Charity registered with the Charity Commission No. 211540