Institute of Physics and Engineering in Medicine (IPEM) Response to "Modernising Radiotherapy Services – Developing Proposals for Future Service Models"

Question 1a: Do you support the proposal to create networked services? Please explain your answer here

IPEM members have in general welcomed the proposals and support the aims for networked radiotherapy services. Closer working relations between regional groups, promoting greater collaboration and peer review between radiotherapy centres are recognised as having clinical benefits for service quality and consistency.

However, members have expressed concerns as to how the proposals, as described, would be workable in practice. There is a risk that the proposals could lead to less equitable clinical services for patients, a reduction in innovative radiotherapy available nationally and exacerbate problems with staff recruitment and retention, particularly in radiotherapy physics.

There are many good examples as to how radiotherapy physics in the UK works collaboratively, such as the IPEM interdepartmental audit that supports absolute dosimetry audits[1], and mentoring and training initiatives that have supported the national implementation of IMRT and Stereotactic Ablative Radiotherapy (SABR[2]). National audits have shown that innovative techniques and technologies have been consistently implemented to a high standard within most centres in the UK.[3,4] In comparison, introduction of IMRT in the USA, although rapid, was highlighted as being initially of poor dosimetric and geometric accuracy in up to 1/3rd of centres[5].

Therefore, IPEM members would be keen to explore other ideas to enable shared knowledge and experience that will further raise the general standard of radiotherapy practice and provide uniform, high-quality, effective and efficient services across the whole of the country. These ideas include:

- Re-establishing the Peer Review process, to include and be guided by outcome metrics;
- National audit of general radiotherapy practice e.g. by resourcing an expansion of the remit of Radiotherapy Trials Quality Assurance (RTTQA);
- Commissioning more Scientist Training Programme (STP)/Practitioner Training Programme (PTP) training places and apprenticeships and encouraging alternative routes to registration;
- Increasing rather than limiting centres opening clinical trials, as these have proved effective in standardizing clinical protocols across the country as well as being a vehicle for the safe implementation of advanced radiotherapy techniques such as IMRT (e.g. CHHiP, ART-Deco, IMPORT ACT2 trials)[6,7].

It would also be important to re-evaluate proposed radiotherapy networks in the context of how effectively they can function in terms of population size, geography, location of a 'lead' provider, equipment mix, access to public and road transport, and

also how they fit with the emerging cancer alliances and vanguards[8], so that radiotherapy can be effectively accessed within a patient's cancer pathway and synchronised with other treatment and support services.

1. Palmer A *et al.* Br J Radiol. 2011 84(1004):733-42.
2. Distefano G *et al* Br. J. Radiol. 2014; 87(1037): 20130681
3. Clark CH *et al.* Radiother Oncol 2014; 113: 272–8.
4. Budgell G *et al.* Radiother Oncol. 2011 99(2):246-52.
5. Ibbott G *et al.* Int J Radiat Oncol Biol Phys. 2008;71:S71–S75.
6. Clark CH *et al.* Br J Radiol. 2015; 88(1055): 20150251
7. Muirhead R *et al.* R Coll Radiol. 2016 pii: S0936-6555(16)30328-4.
8. https://www.england.nhs.uk/wp-content/uploads/2016/10/cancer-one-year-on.pdf

Question 1b: What comments and/or ideas do you have about how networked services could be organised?

It is important to note that radiotherapy physics services are often part of a broader medical physics service within hospital trusts. This can be particularly valuable as the delivery of advanced radiotherapy increasingly relies on the pooling of expertise in advanced imaging techniques (PET-CT, MRI), radiation safety and protection, scientific computing, equipment management etc. Therefore, networking radiotherapy physicists alone would present challenges in terms of local management structures, governance and may not provide the right access to the required radiotherapy expert.

Effective delivery of radiotherapy depends on multi-disciplinary teams and team-working, where physicists play a key role. However, other staff groups would need just as much willingness, ability and flexibility to support a network, e.g. clinical oncologists providing cross-cover and peer review, radiographers developing practice as well as technologists and engineers providing planning and equipment expertise. Professional team working relationships may be a challenge to foster and build 'at a distance' by a lead network provider.

Centralised treatment planning on a supra-regional level may also limit essential local integrated working between clinicians, treatment planning staff and radiographer staff delivering the treatment. This may lead to sub-optimal treatment and potentially an increased risk of incidents. Centralisation of planning and physics services could also lead to a loss of expertise outside the lead provider, and could restrict opportunities for innovation, CPD and create recruitment and retention issues.

The success of radiotherapy networks are likely to depend upon the management structure applied. A formal collaborative approach, maintaining individual centres, may be more effective than a single multi-professional team working from a central hub. A return to the previous cancer network structures with collaboration between neighbouring trusts and mutual support/independent peer review would allow a regional standardisation and improvement in practice and facilitate the dissemination of new techniques such as SABR.

Question 2: What comments and/ or ideas do you have about how the proposals could work in practice?

The effectiveness of a network will be dependent upon effective and robust IT linking the network partners, agreed data-sharing/IG arrangements, contractual agreements regarding IRMER regulations, CWT targets and clinical governance, amongst many other considerations. The resource and cost implications for this are significant and should not be underestimated.

Unifying clinical protocols, QA, planning techniques etc. in light of current diversity of equipment also should not be underestimated in terms of the required cost and resources. Homogenising equipment across networks (treatment machines, treatment planning systems, Record & Verification systems, QA equipment etc.), if desired, would be an expensive and long-term project with the potential risk of losing access to innovative approaches from other manufacturers. A better driver would be to mandate the various manufacturers to adopt integrated DICOM standards and workflows, etc.

Sharing treatment planning resources, and sharing a 'contouring' platform for Oncologists to peer review and cover each other's patients would be highly beneficial and is technically feasible, as some of the infrastructure already exists embedded within Clinical Trials and RTTQA. Similarly, shared radiotherapy physics machine commissioning experience could be very valuable, especially where the same models of linac and treatment planning systems are in operation.

Question 3a: Please explain whether you feel that the case numbers presented within the clinical and service model reflect clinical best practice?

IPEM members have argued that very little evidence has been presented to justify the proposed case numbers. They have also highlighted the large variation in practice/caseload across all the proposed networks, making a generalizable network model difficult to implement. A more flexible framework, to accommodate regional circumstances, should instead be formulated to optimise services in each particular region. A detailed, evidence based assessment of patient outcomes should also be carried out to justify a new service model, in particular where changes may result in patients having to travel further for treatment but with no clear clinical benefit.

Absolute patient numbers treated may not necessarily correlate with high quality treatment or improved outcomes. It should also be acknowledged that smaller centres have made large contributions to clinical trial recruitment involving complex radiotherapy techniques (e.g. IMPORT breast trials, CHHiP, ART-Deco). Recent evidence has shown strong independent association between cancer survival and participation in interventional clinical studies for patients with rare (colorectal) cancer[9].

It is also important to consider expected or potential future changes in patient numbers. If centres lose expertise in techniques or treating less common sites, reinstating services will be significantly more challenging than maintaining current services and local expertise.

9. Downing A, *et al.* Gut 2017;66:89–96.

Question 3b: Can you think of anything else that should be considered that may impact on the case numbers proposed?

Less common cancer sites vary enormously in referral numbers per centre. Even some of the very largest centres would not meet the suggested 25-50 patients per annum per oncologist for certain sites e.g. anal canal.

Analysis of the national radiotherapy dataset (RTDS) demonstrates a trend that the larger the population served, the fewer radiotherapy attendances there are per million population and also the fewer linacs there are available per million population. There is also a trend that the higher the population served, the greater the mean number of attendances per linac. This implies that the larger the centre, the more likely it is to have an unmet need for radiotherapy within existing populations and less capacity to increase the amount of specialist work.

Question 4a: What equality and/or health inequality issues may arise as a result of the proposals, as they currently stand?

Many members felt that the proposals are likely to further disadvantage already disadvantaged population groups. There is much published evidence that demonstrates the further patients are expected to travel for radiotherapy, the less likely they are to access radiotherapy. This trend is especially strong for those in disadvantaged communities[10]. A recent study of 26,845 rectal cancer patients demonstrated that patients who had a travel distance of less than 12.5 miles were 60% more likely to receive radiotherapy than those who had travel distances over 50 miles[11]. Those who were female, non-white, aged over 50 and had comorbidities were also significantly less likely to receive radiotherapy.

There are also potential equality issues with regards to staff. A single radiotherapy physics service will lead to the requirement for additional travel. This is likely to discriminate against staff members with childcare / carer demands, and be costly in terms of travel time and access to equipment. There is also a risk that recruitment and retention of physicists to radiotherapy centres other than the lead provider will become increasingly difficult. Staff in local centres would become de-skilled if only treating more common cancers, with less opportunities for development and training.

10. Ambroggi M *et al.* The Oncologist 2015;20:1378–1385.
11. Lin CC *et al.* Int. J. Radiat. Oncol. Biol. Phys. 2016; 94(4): 719-28.

Question 4b: What steps should be taken to avoid any equality and/or health inequality?

For low income households, the ability to keep working through treatment is likely to be a very important consideration. Inequality would best be avoided if all centres are enabled and supported to deliver innovative and modern radiotherapy, participate in clinical trials and increase the availability of advanced treatments close to home.

A lead provider model could be useful if it supported shared learning in each service of the network. All providers should work in unison towards the highest quality of

care possible by enabling locally based staff to excel. It should not be disruptive to the staffing of locally based integrated treatment centres.

Question 5: Is there anything else that we need to take into account when developing the service specification?

IPEM believes that delivering safe, effective and timely treatment for patients is the core business of radiotherapy physics services.

A position statement on the impact of extended clinical hours and 7-day working has previously been published[12] . It was recommended that extending the clinical working hours and/or increasing the activity of a centre will require an increase in physics, engineering and technologist personnel at all grades. In addition, adequate numbers of Medical Physics Experts are important to ensure a safe radiotherapy service.

The IPEM position on the radiotherapy physics workforce was updated in June 2016[13]. The recommendations made were to increase STP, PTP and apprenticeship commissions, as well as encourage alternative routes to registration, including Route 2. In other words, more scientists and practitioners need to be trained to address the current shortage in the skilled scientific and technical workforce and to avoid a worsening situation in the future.

The UK access rates to radiotherapy are only around 2/3 of optimal levels[14]. This is as true for common cancers as for rare cancers. More thought should be given to how this unmet need can be addressed.

12. https://www.ipem.ac.uk/Portals/0/Documents/Publications/Policy%20Statements/Radiotherapy%20Extended%20Working%20Hours%20Position%20Statement%20Sep%202014.pdf
13. https://www.ipem.ac.uk/Portals/0/UPDATED%20POSITION%20STATEMENT%20on%20the%20Radiotherapy%20Physics%20Workforce%20FINAL.pdf
14. Borras *et al.* Radiotherapy and Oncology 2015; 116: 38-44

In compiling the response to this consultation, members were asked to declare any conflicts of interest they might have had.