

Proton Beam Therapy - Guidance

Summary

The Society and College of Radiographers (SCoR) publishes this guidance and advice document to provide members and education providers with an overview of the educational and professional requirements for effective delivery of proton beam therapy (PBT) services.

1. Introduction

The Department of Health has funded two high energy PBT centres, one in the North West of England at The Christie Hospital, Manchester centre; and one at University College London Hospitals (UCLH).¹ This is in addition to the longstanding provision of lower energy PBT services for some cancers of the eye, at the Clatterbridge Cancer Centre in the Wirral²; as well as private provision of PBT.

The Christie Hospital is currently treating patients and UCLH is expected to start accepting patients for this service in 2020. Once both centres are fully operational they will treat up to 750 patients per year, including approximately 150 paediatric patients with tumours. The remaining patient population will comprise of approximately 100 teenagers and young adults per centre, alongside adult patients with complex tumours including base of skull, paraspinal / pelvic sarcomas and complex head and neck cases.

To deliver this care, each centre is co-located within an established oncology centre and consists of three 360° rotating treatment gantries. There is multidisciplinary workforce in place and each centre will have a compliment of approximately 50 therapeutic radiographers. Many radiographers will rotate across both photon beam and proton beam therapies within the service, which is important for providing opportunities to work in proton therapy and for maintaining photon therapy competencies.

2. Aim of the Document

The aim of this guidance document is to present education providers and SoR members with an overview of the educational and professional requirements for effective delivery of a PBT service.

This guidance is consistent with the following documents:

- The Education and Career Framework³; covering outcomes for practitioners and advanced practitioners and the indicative pre-registration curriculum;
- The scope of professional practice⁴; detailing actions for individuals defining their scope of practice;
- SCoR response to recommendations of the Francis Report⁵ in relation to the maintenance of practitioner competence;
- The continuing professional development requirements of the Health and Care Professions Council.⁶

3. Integration with Career and Professional Development Frameworks

PBT will be fully integrated within the existing provision as another form of radiotherapy. Although nationally most therapeutic radiographers will not deliver PBT, practitioners should be equipped to take advantage of opportunities that may present to work in this specialism.

It is also essential that all members of the profession have an understanding of how PBT works and the possible indications for its use, to be able to advise both patients and other health care professionals accordingly. All referrals to the PBT service for children and young adults will come from Principal Treatment Centres⁷ and adult referrals will come from these centres and other radiotherapy departments. Therapeutic radiographers at other centres may be involved in the referral pathway¹ and will need to be able to talk intelligently to patients and others about this service in order to inform and support decision making. Therapeutic radiographers will need to convey information about PBT to those patients and carers who are receiving photon therapy, as they may have queries about this treatment in light of increased media coverage.

To support understanding and knowledge of PBT, an e-Learning for Health (e-LfH) programme has been developed in partnership with the Society and College of Radiographers, The Royal College of Radiologists and the Institute of Physics and Engineering in Medicine.⁸

It is strongly advised that all practitioners complete this programme and that this be incorporated into pre-registration training. This programme is free to all practitioners working within the NHS and to students.

For service delivery, a stratified professional workforce is in place from bands five to eight, consistent with photon therapy services, including advanced and consultant practice roles.⁹ All practitioners working in PBT will receive additional competency-based inductions and on-going training. The clinical environment, similarly to photon therapy, will offer opportunities for therapeutic radiographers to develop advanced clinical practice roles, underpinned by College of Radiographers approved masters' level education programmes. Many patients will be enrolled in clinical trials and there will be significant opportunities for engaging in high quality practice-related research activities across the patient pathway, during pre-treatment, treatment delivery and aftercare.

The UK NHS England PBT services utilise second generation equipment, incorporating both Kilovoltage and Cone Beam imaging systems. Although there are some specific training needs for image analysis, with regard to skills of image interpretation, proton dosimetry and adaptation of treatment protocols, the image guided radiotherapy skills acquired by radiographers providing photon therapy are directly transferable to PBT.

4. Learning and Development for Pre-registration Students and Therapeutic Radiographers not Directly Engaged in PBT

The indicative curriculum set out in the Education and Career Framework³ has been revised to ensure that pre-registration students have the necessary underpinning knowledge and skills to achieve specified practitioner outcomes, following preceptorship in a modern radiotherapy service with the latest technology. With respect to PBT, approved programmes should include:

- Physical properties of protons;
- Generation of clinical proton beams;
- Characteristics and dosimetry of protons beams;
- Clinical indications for proton beam therapy;
- Cross-sectional anatomy;
- Imaging and working with 3D, aspiring to 4D;
- Use of functional imaging with PET and MR;
- Immobilisation techniques.

5. Competencies for Practitioners Delivering PBT

Therapeutic radiography staff will receive additional competency-based training within each centre. In addition to completing the e-Learning for Healthcare (e-LfH) programme accessible to all NHS staff, practitioners delivering PBT will be required to meet indicative learning outcomes.

Practitioners should be able to:

- Provide site and PBT-specific information and support to patients and their carers;
- Plan and deliver safe, accurate PBT to patients within protocols, ensuring the radiation safety of all;
- Manage the care pathway for patients receiving PBT, including relationships with referring centres.

Practitioners will need to have up to date knowledge and understanding of:

- National proton referral pathways and treatment scheduling;
- Proton therapy physics;
- Radiobiology of charged particles;
- Particle accelerators;
- Quality Assurance protocols;
- Radiation protection;
- Proton dosimetry
- Uses and contra-indications for proton beam therapy;
- Cross-sectional anatomy;
- Imaging and working with 2D, 3D, aspiring to 4D;
- Functional imaging with PET and MR;
- Immobilisation techniques;
- Toxicity and symptom control.

Conclusion

There is a role for the entire therapeutic radiography workforce as PBT services are integrated within radiotherapy nationally. Therapeutic radiographers not directly involved in PBT delivery should have the knowledge identified above, with a clear understanding of the eligibility criteria for treatment and referral mechanisms in place across the UK.

Therapeutic radiography staff delivering PBT will develop further competencies to support patients through the pathway, to deliver treatment and integrate fully into the multidisciplinary team.

References

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