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Version: Accepted Version

Proceedings Paper:
Brown, S, Van Herk, M, Chuter, R et al. (18 more authors) (2018) Advanced Radiotherapy Technologies Network in the UK (ART-NET) - focus on lung cancer. In: Lung Cancer. 16th Annual British Thoracic Oncology Group Conference 2018, 24-26 Jan 2018, Dublin, Ireland. Elsevier , S60-S60.

https://doi.org/10.1016/S0169-5002(18)30166-1

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Introduction: Lung cancer is the most frequently diagnosed cancer worldwide. Whilst the role of curative-intent radiotherapy is widely accepted, the thorax remains a challenging anatomical site to irradiate. New advanced radiotherapy technologies including stereotactic ablative radiotherapy (SABR), magnetic resonance image-guided radiotherapy (MR-Linac) and proton-beam therapy (PBT) have potential to yield substantial clinical benefits. However there are significant challenges for development, assessment and rational implementation within the NHS.

Methods: ART-NET is funded by a Cancer Research UK accelerator award. The goal of ART-NET is to accelerate clinical translation of SABR, MR-Linac and PBT, around the unifying theme of hypo- fractionated radiotherapy, and to provide an evidence-based rationale across a range of tumour types. This is being conducted across 5 UK centres and will develop and disseminate expertise in medical physics required to lead the development of planning and image-guided solutions for these technologies.

Results: ART-NET will implement methodologies for reliable treatment plan optimization on MR-images, acquired directly prior to or during treatment, enabling the clinical benefit of MR-guided SABR and MR-Linac to be fully exploited. ART-NET will also co- ordinate methodological developments in design and conduct of clinical trials to streamline assessments of new health technologies in specific tumours. An example is the development of a traffic light system to facilitate online radiographer review of CBCTs in patients undergoing lung SABR to assess organ motion and anatomical changes. This will inform the need for plan adaptation nationally.

Conclusion: A key aim of ART-NET is to generate national treatment protocols and disseminate them across the UK, improving and harmonising practice. Additionally, involvement of medical physicists, research radiographers and clinical research fellows in ART-NET will develop a skilled workforce that will be a huge asset for future radiotherapy research in the UK. Ultimately this will improve patient access to state-of-the-art radiotherapy and increase recruitment into clinical trials.