

# Evolution of the advanced radiographer role for lung cancer radiotherapy

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**Introduction:** In 2011 the position of advanced radiographer for lung cancer was introduced. It was anticipated that the applicant would evolve the role to fit the department’s needs. It was felt that the lung cancer pathway within the department had not evolved at the same rate as some of the other body sites and with recent technological advancements and recently updated equipment the lung pathway could be significantly improved by utilising this new equipment.

**Aim:** To improve the pathway for lung cancer patients receiving radiotherapy. This was achieved by identifying key areas of the patient pathway which could be improved by updating procedures and techniques then prioritising and overseeing their implementation.

**Method:** There were four main techniques identified that would significantly improve the treatment offered for lung patients. These were then prioritised in the following order:

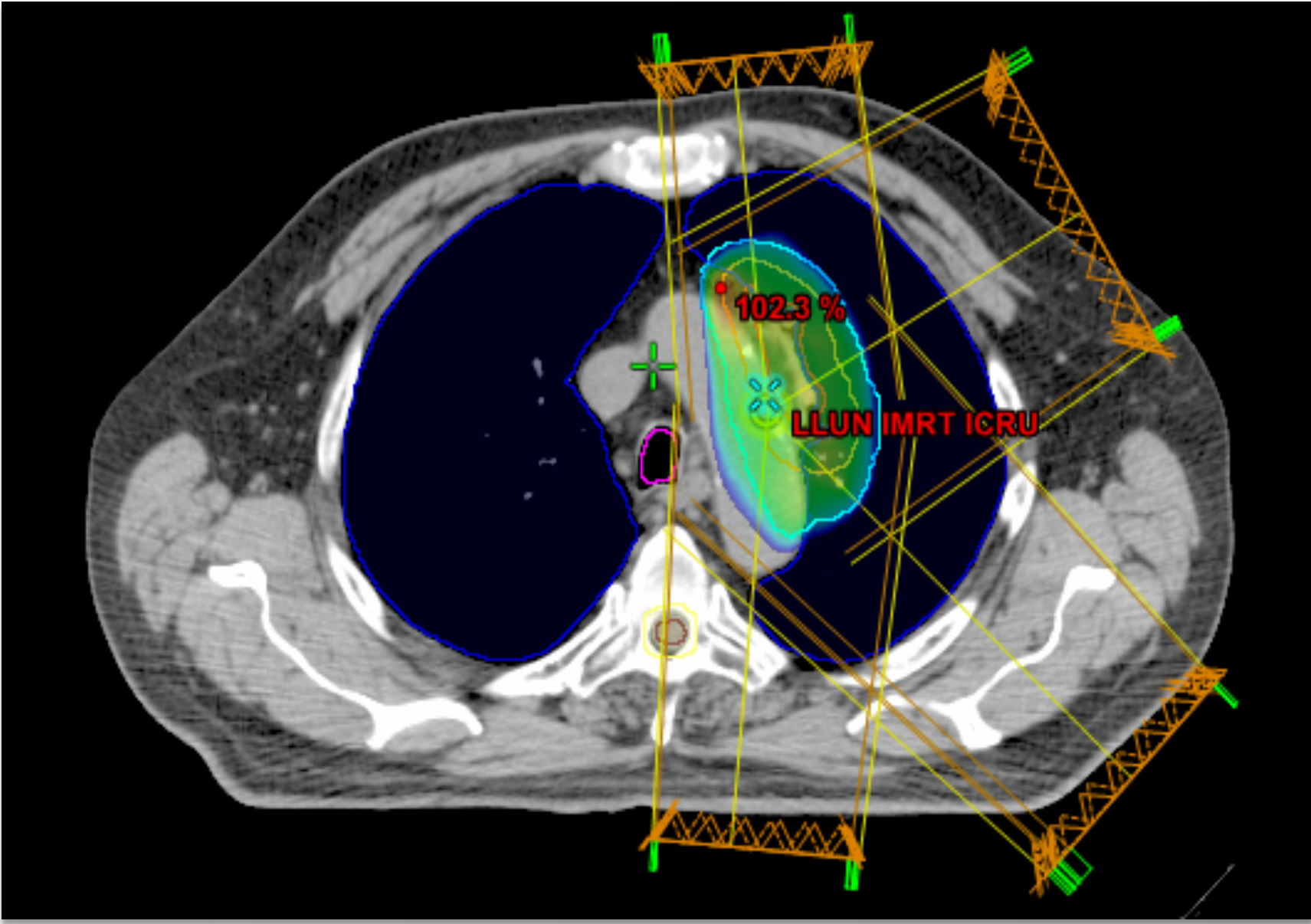
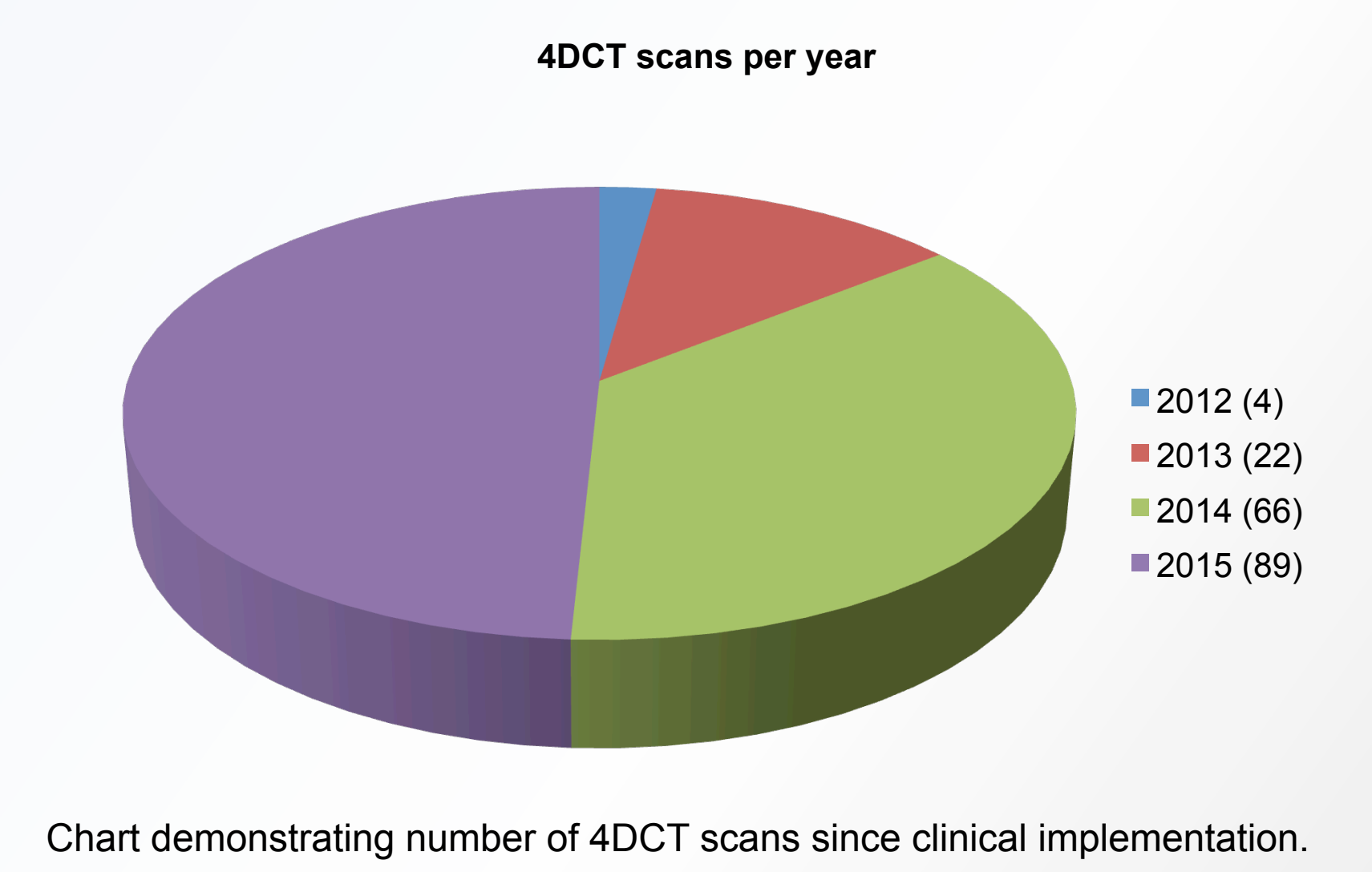
The first technique to be introduced was 4DCT scanning. This was prioritised because it was predicted to benefit most radical NSCLC patients and was a relatively simple technique to introduce. 4DCT scanning was initially introduced for selected patients until more experience was gained then later introduced for all radical NSCLC patients with clearly definable disease.

During the department’s participation in the i-START trial it was deemed necessary to introduce IMRT lung planning for challenging lung cases. Therefore the second main improvement to the patient pathway was the development of a “Simple IMRT” technique for challenging lung cases. This is now in routine clinical use for radical lung patients with challenging volumes and involves the use of just 3 or 4 beams simply optimised to achieve improved PTV volume coverage and sparing of OARs.

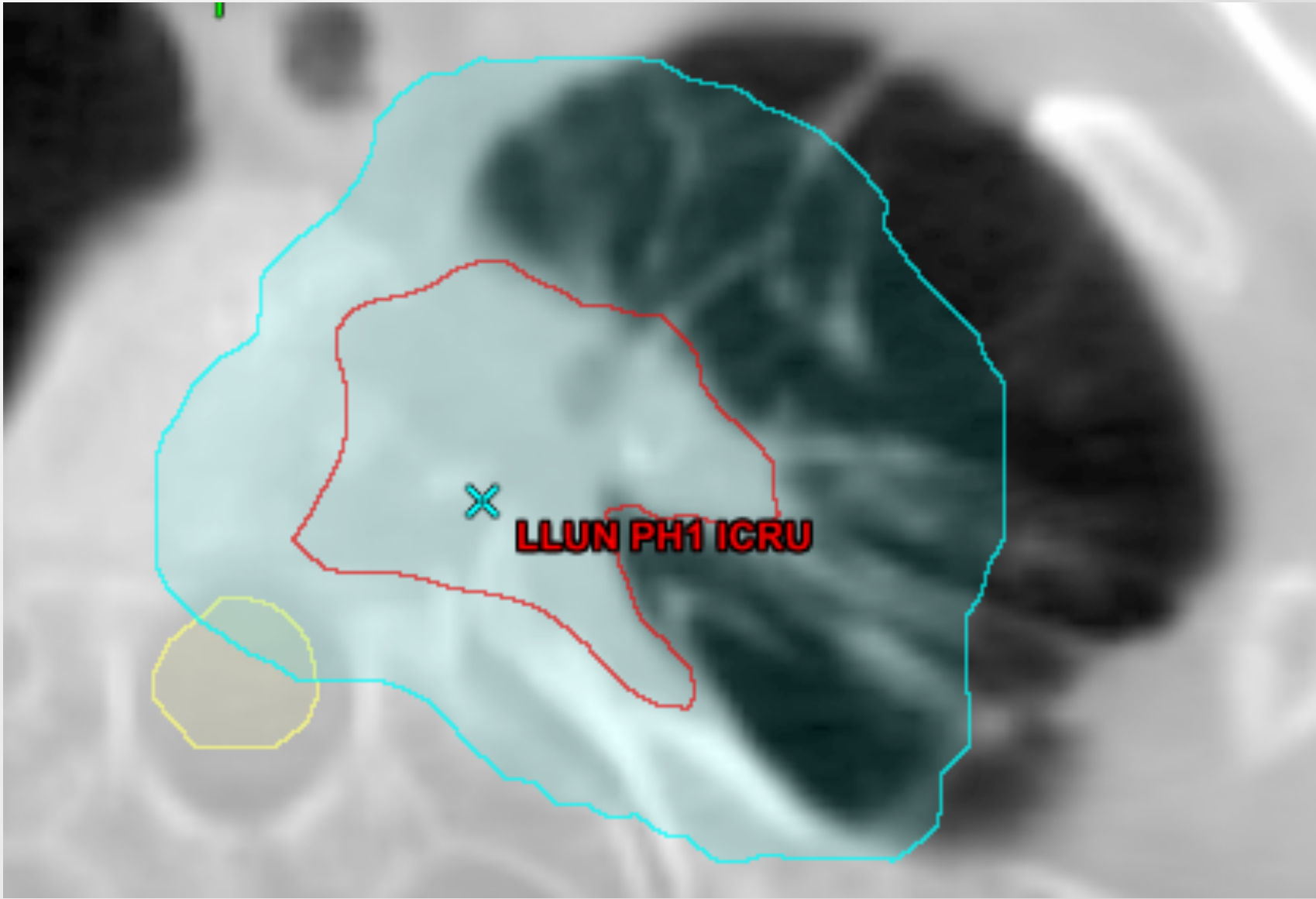
The third improvement to the patient pathway to be implemented was CBCT online verification. At this stage work had already begun on introducing SABR treatment to the department and CBCT online verification had been identified as a necessary technique for the safe delivery of SABR treatment <sup>1</sup>. Therefore, a protocol was created initially for selected standardly fractionated lung patients so the department could gain experience with CBCT online lung tumour matching before a separate protocol for future SABR patients could be established.

Following on from the introduction of CBCT for lung patients the fourth main improvement to the patient pathway was the introduction of SABR treatment. VMAT was already in routine use for prostate patients so an adapted VMAT technique was implemented using dual half arcs for SABR patients with online CBCT matching with daily “zero-tolerance” direct soft tissue corrections.

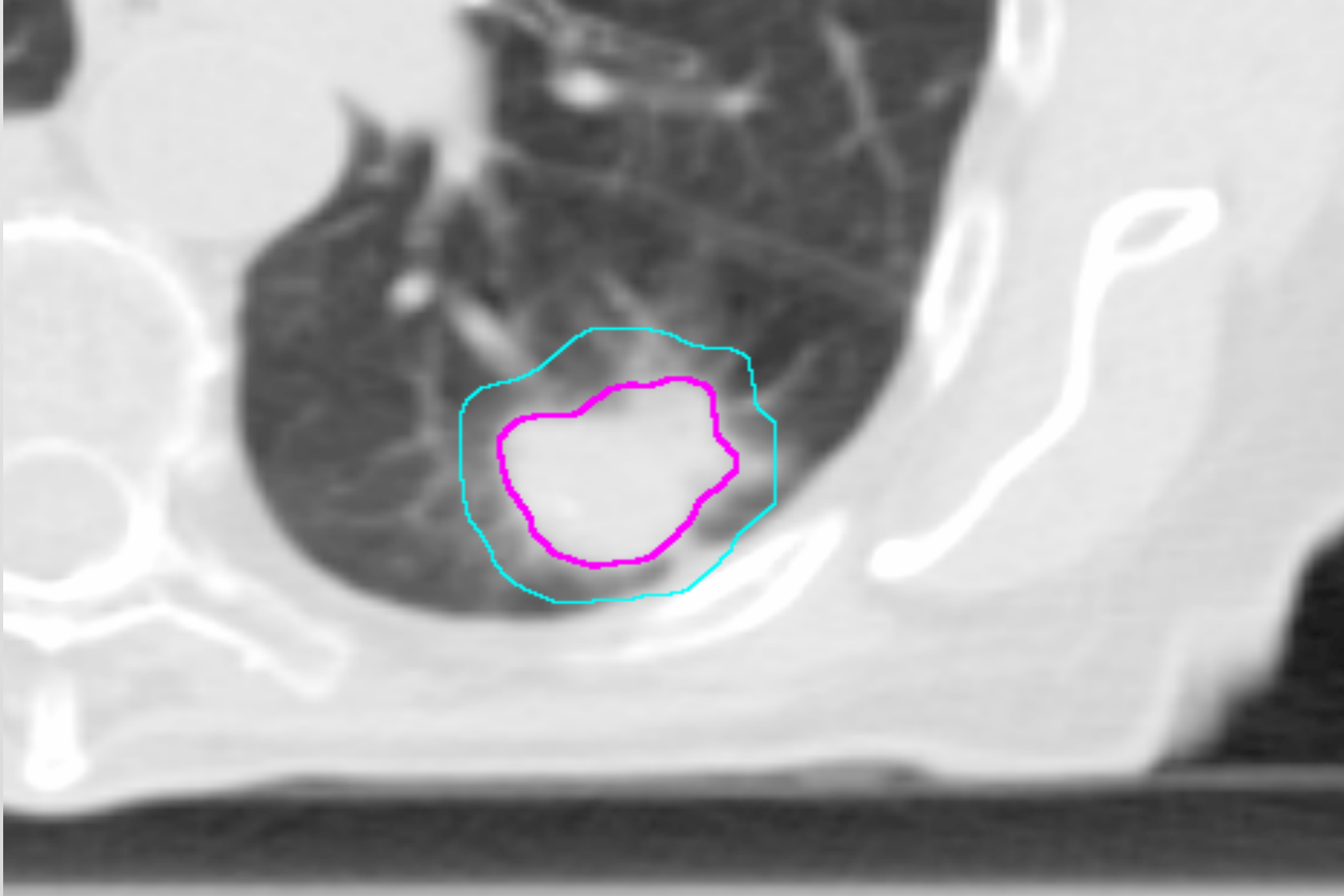
SABR is now in routine use for early stage NSCLC patients who are unfit for surgery or who refuse surgery.



Example of the “Simple IMRT” technique for a lung patient using 4 optimised beams.



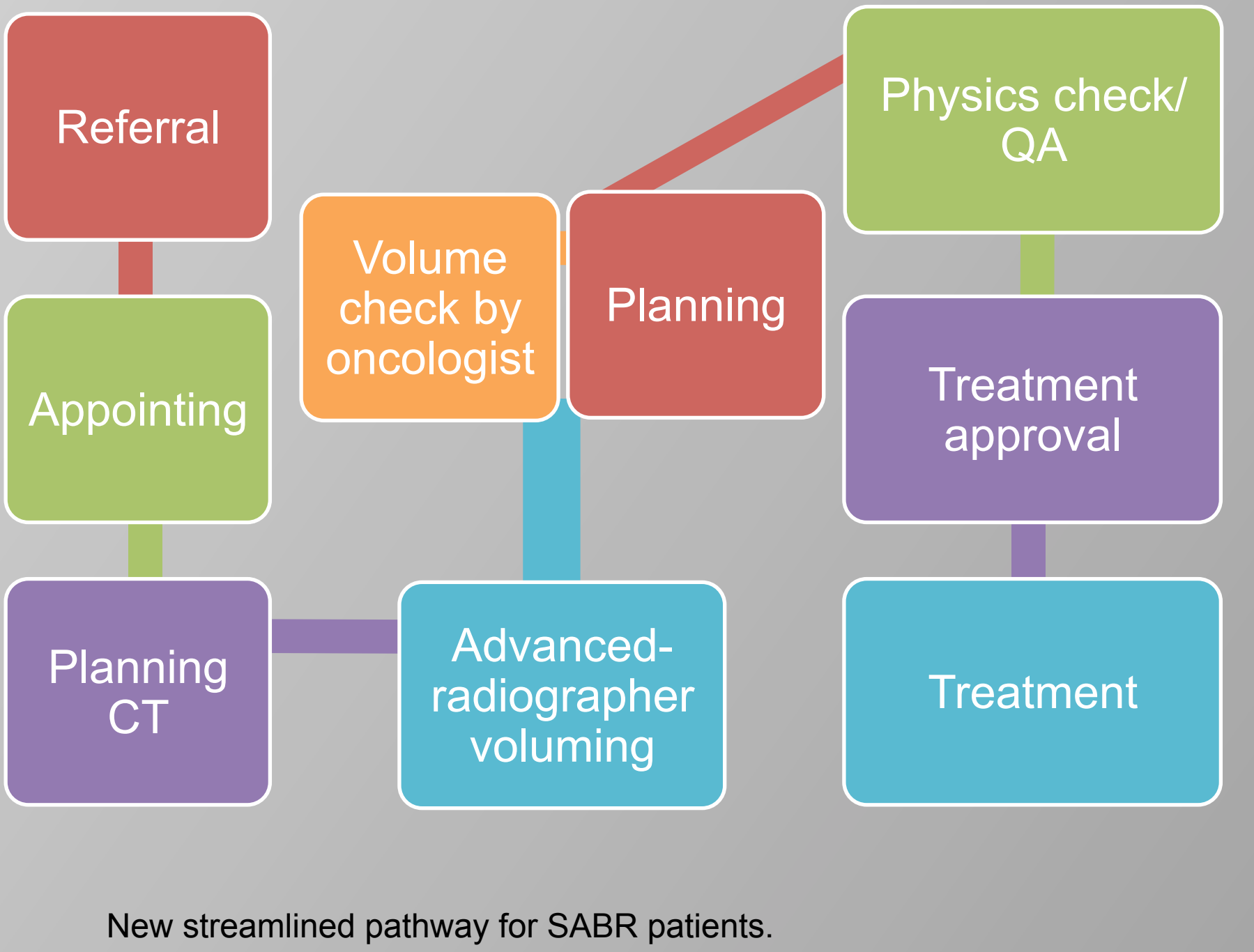
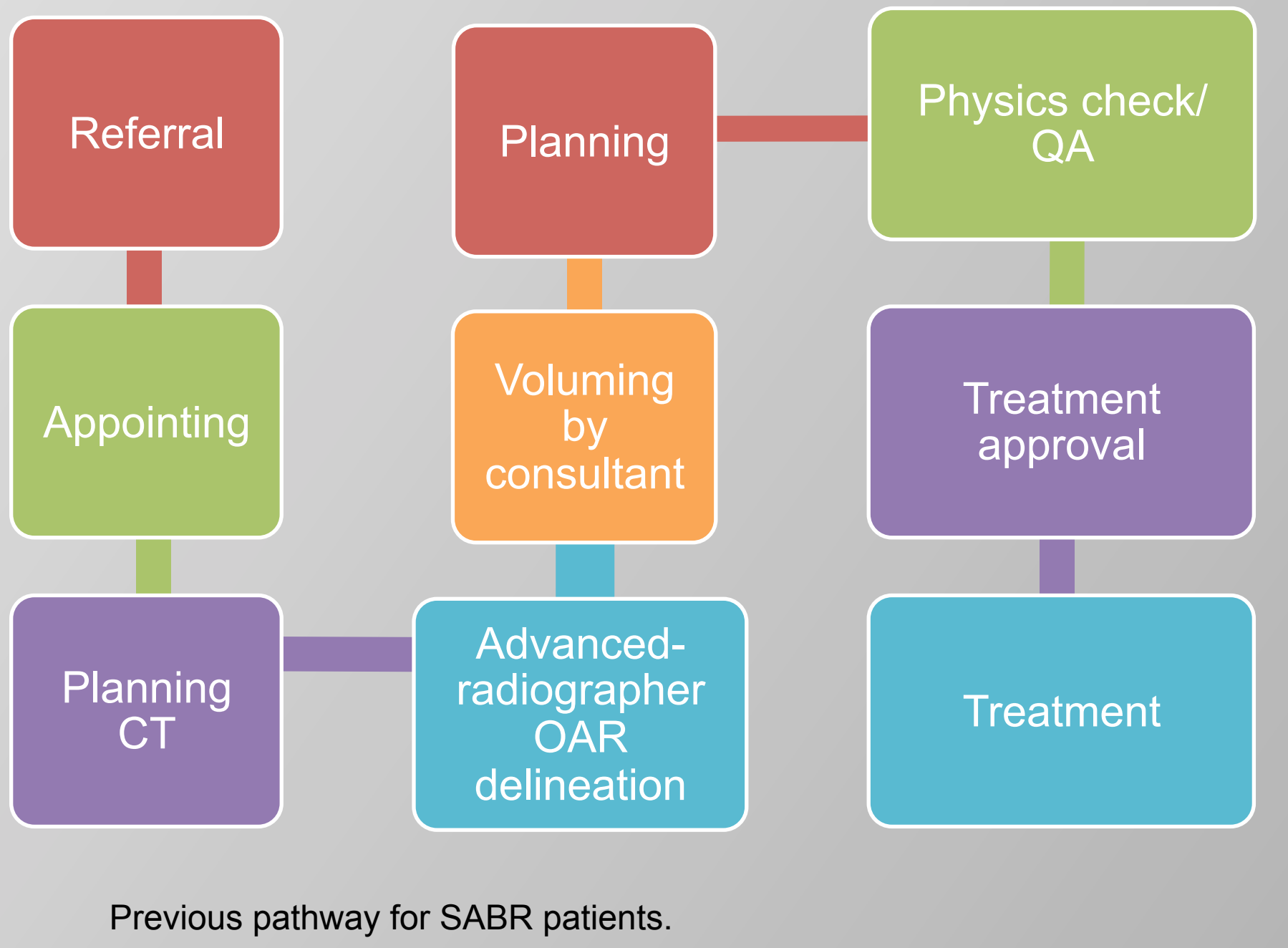
Example of early CBCT match with tumour encroaching spinal canal – daily CBCTs were obtained to ensure cord tolerance could be met.



Example of a SABR patient with an early stage lung tumour volumed by the advanced radiographer for lung cancer

**Discussion:** This role has evolved around the need to introduce technique advancements as these were deemed the most urgent aspect of the patient pathway to be updated <sup>2, 3</sup>. On-going and future projects are not so technique-biased and involve streamlining pathways and improving the advanced-radiographer’s knowledge of lung cancer. Examples of on-going projects include: further development of the SABR treatment technique and advanced-radiographer-led lung tumour delineation; .

The introduction of advanced-radiographer-led lung tumour delineation for early stage NSCLC has streamlined the patient pathway for SABR patients and saved consultant time. Rather than the consultant defining the OARs and voluming the lung tumour the advanced radiographer defines all of the OARs and volumes the lung tumour and this is verified by the consultant at a convenient time. This means that the planning process can often be initiated earlier thus streamlining the process and saving time for the consultant. In addition this has expanded the role of the advanced radiographer and enhanced their knowledge of lung cancer making online CBCT lung tumour matching safer..



**Conclusion:** The role of the advanced-radiographer for lung cancer has evolved from introducing technique advances to streamlining the patient pathway. However potential projects for future development could alter the scope of this role leading to a more even distribution of expertise and advancing practice. These include: advanced-radiographer-led palliative planning; radiographer-led informed consent, on-treatment review of SABR patients and a telephone follow-up clinic post SABR treatment.

## References

- 1 National UK SABR Consortium Guidelines. (2016). Stereotactic Ablative Body Radiation Therapy (SABR): A Resource. Endorsed by The Faculty of Clinical Oncology of the Royal College of Radiologists.
- 2 Haasbeek, C. J. A., Slotman, B. J. & Senan, S. (2009) Radiotherapy for lung cancer: Clinical impact of recent technical advances. Lung Cancer. 64(1)1-8.
- 3 Senan, S. Palma, D. A. & Lagerwaard, F. J. (2014). Stereotactic ablative radiotherapy for stage 1 NSCLC: Recent advances and controversies. Journal of Thoracic Disease. 3(3).