

Case study: Northern Centre for Cancer Care

STREAMLINED TREATMENT PLANNING AT NCCC



Freeman Hospital, Newcastle upon Tyne, UK

The Northern Centre for Cancer Care (NCCC), located at the Freeman Hospital in Newcastle upon Tyne, UK, is a large facility that serves a population of 2 million people in northeast England. When the center needed to increase operational efficiency to meet the combined challenges of increasing patient numbers and nationwide skills shortages, RayStation® became a central part of the solution. RayStation has enabled the center to do more with existing resources and is now central to the workflow.



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Established in 2009, NCCC is the largest center of its kind in the north of England. It provides a regional service for specialized radiotherapy treatments including TBI, TSEI, SRS and pediatrics. The radiation therapy department receives over 4,500 new patient referrals per year. A wide range of treatment techniques is on offer, including IMRT, IGRT, total body irradiation, brachytherapy, stereotactic radiosurgery, chemo-radiation, lung and spine SABR and CHART treatment for lung cancer.

NCCC has made substantial investments in state-of-the-art equipment to expand and improve its radiation therapy service. The center is equipped with the latest radiation therapy technology, including new Varian TrueBeam® linacs, TomoTherapy, superficial radiation therapy and HDR brachytherapy. RayStation was selected as the optimal treatment planning system and has been used clinically at NCCC since 2016.

Optimizing resources

“Efficiency is increasingly crucial in the UK healthcare climate,” says Chris Walker, Head of Radiotherapy Physics at NCCC. “Growing numbers of cancer cases and a national shortage of radiation therapy professionals have made it paramount to leverage our available competence mix as fully as possible. RayStation’s capabilities enable us to mitigate these skills shortages.”

According to Walker, the gains have been better than expected. “RayStation has enabled us to significantly increase plan production. The use of RayStation, coupled with improved treatment delivery technologies, has resulted in a net gain in daily treatment capacity. But it’s about quality as well as quantity – we have also been able to achieve more consistent and homogeneous plans irrespective of the experience of the planner.”



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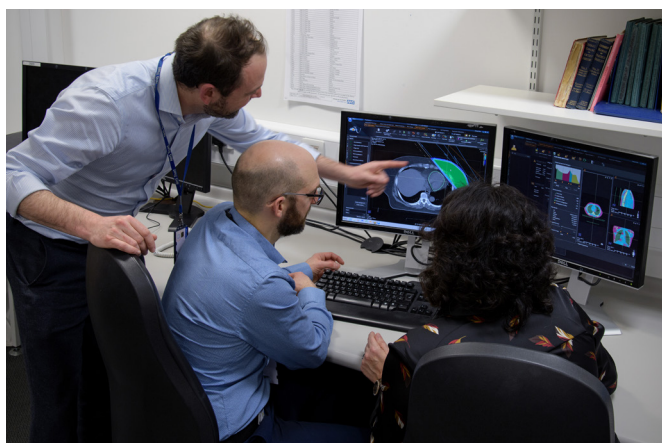
Speed and functionality

Technology is an important tool for NCCC in optimizing resource usage. “Radiation therapy is a technology-led specialty,” Walker says. “Technology helps make the most of the skills we have onboard. Specialists need to be able to focus on their areas of expertise rather than getting bogged down in routine tasks. RayStation’s scripting and automation capabilities make a strong contribution.”

Walker says RayStation’s high calculation speed provided an immediately noticeable improvement over the center’s previous treatment planning system. “In the PACE prostate VMAT SABR trial, RayStation cut the time for optimization and calculation of final dose from 40 minutes to just 3 minutes.”

This high speed also makes it possible for the planner to perform a reoptimization while the clinician is still present, ensuring a highly effective process.

“Calculation speed was a big draw for us,” Walker says, “but it was important to enable a clear understanding of the plan; to know exactly where the compromises are. RayStation is highly interactive. It performs complex dose calculations, yet you can still see how it happens. This transparency makes it ideal for staff training.”



Efficient automation

Templates and scripting have enabled NCCC to achieve optimal plans in less time, Walker says. “We embraced templates using auto-segmentation as an excellent way to save time and improve consistency. Previously, we had to create each volume from scratch, which is extremely time-consuming. Now we can ensure that everyone uses the same conventions for naming and color coding, which makes the peer review process much easier.”

NCCC made an efficiency breakthrough by developing an automated plan checking routine, based on the scripting capabilities of RayStation. Generic and protocol-specific checks are run automatically for every plan, covering parameters such as patient identifiers, clinical goals, beam geometry and margins for target volumes.

“This automated self-check before clinical evaluation increases safety and plan homogeneity and consistency, as well saving 20 minutes per patient,” Walker says. “It’s also valuable as a training tool. I’m impressed by how much can be achieved with scripting in RayStation and how customizable the system is. We now use scripting for many aspects of the plan production process.”

Scripting is also at the heart of NCCC’s automated breast planning approach, based on the rayAutoBreast module but customized to the center’s preferences. The approach has resulted in plan quality improvements and patient time savings of up to 1.5 hours, as well as savings in clinician time. Previously, the center treated around 30 breast patients per day with its older treatment delivery technologies. This has increased to around 39 as a consequence of fully utilizing the new equipment – an increase of approximately 30%.



Major gains

The results speak for themselves. NCCC has freed up significant time and shortened some patient pathways by up to 50%, for example breast and prostate, with a process that requires just one clinician session instead of two. The efficiency of RayStation, coupled with new delivery technologies, has also enabled the center to increase the percentage of fractions delivered as IMRT from 30% to 55%.

“We have achieved outstanding efficiency gains with RayStation at the same time as improving the quality of our treatment plans,” Walker says. “By optimizing our workflow and automating parts of the process, we have saved significant time and increased capacity, enabling us to plan for and treat more patients each day. Being able to do more with the same resources means we can put additional focus into more complex cases and activities such as training.”

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ADVANCING CANCER TREATMENT

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