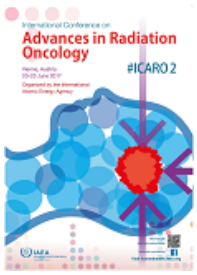

Contribution ID: **277** Type: **Oral Presentation**

Moving a large and complex radiotherapy department: a medical physics perspective

Wednesday 21 June 2017 11:50 (10 minutes)

Introduction: On June 23, 2016, Peter MacCallum Cancer Centre in Australia moved to a new site in Melbourne close to Melbourne University and a large teaching hospital. The new centre opened on 27 June with four new (Varian Truebeam) and two relocated linear accelerators (21iX, Truebeam STX) in addition to a full suite of brachytherapy and special services such as total body irradiation. Seventy patients were part way through treatment at transition.

We describe the project planning stages and the lessons learned from the project of moving a large radiotherapy department over a single weekend. Of particular interest are the role of medical physicists and the quality assurance measures put in place to ensure the safe transition.

Methods: Preparations for the move commenced several years before the actual move; however, medical physicists only became involved intensively about 18 months prior with focus on radiation safety and commissioning. Fortnightly and in the last three months weekly meetings were held by a senior multidisciplinary steering group to review progress against the transition plan. Additional resources were obtained for medical physics as two temporary positions for 12 months and new equipment including a scanning water phantom.

All new machines were commissioned or re-commissioned following national and international guidelines and independently checked by the Australian Clinical Dosimetry Service (ACDS). Of the transfer patients, sixty had treatment plans created using Varian Eclipse (mostly IMRT) and ten ELEKTA Xio. About the same number of new patients started treatment in the first two weeks of operation including 10MV, FFF beams and VMAT as new treatment modalities. All plans were checked using Mobius M3D plan check software and verified by analysing the MLC delivery files using Mobius FX. Additional patient specific QA measurements were carried out for all transferred IMRT patients using physical measurements (ArcCheck diode array).

Results: While activities such as acceptance testing and commissioning were well predicted the implications of moving a complete radiotherapy service over one weekend created significant unexpected workload in particular in the weeks after the move. The use of new equipment and the introduction of new features required training and creation of documentation 'on the fly'. The need to treat patients sequentially on more than one campus created additional patient specific QA requirements and the demand for new services increased faster than anticipated. Areas that were found to be under-resourced were radiation safety and IT support. A particularly interesting process was the development of a security plan for high consequence sources (HDR brachytherapy) as part of a heightened public awareness of the risk of nuclear terrorism. Similarly, the new IT infrastructure had not adequately accounted for the complexity and criticality of moving multiple planning systems and a radiotherapy information system (ELEKTA Mosaiq) while maintaining continuity of operation not just for the main site but also four satellite centres.

Full or partial patient specific QA results over the transition time were analysed for 147 IMRT and VMAT patients. Mobius provided an efficient process for plan review (M3D) and verification of treatment delivery (MFX) based on independent beam data and incorporates patient specific heterogeneities. There was good correlation between M3D and MFX results verifying accurate MLC movements. The ArcCheck physical measurements, particularly the ion chamber in the centre provide an additional layer of confidence in the actual delivery even if their passing rates of a 3mm/3% gamma criterion did not correlate with the same criteria for the same plan in Mobius.

The workload particularly for senior physicists familiar with the local procedures increased significantly due to moving over a single weekend. As some complex services (total body irradiation, stereotactic procedures

and intraoperative radiotherapy) had been partially restricted prior to the move, demand for these physics intensive services built up very quickly. The time required for senior staff not only to ensure safe introduction of new services but to prepare adequate documentation in parallel was underestimated as was the need for training provision. The fact that the move occurred in the middle of winter, a time prone to people falling sick, did add to staff shortages.
Finally, the near miss of a major accident caused significant strain in investigation, rectifying, reporting and documentation but highlighted the importance of a thorough quality assurance program.

Conclusion: The successful move of a large and complex radiotherapy department required a lot of input from medical physicists. The move over a single weekend caused some interesting challenges for staff. In the transition planning process more attention should have been paid to the first three months after the transition when new procedures have to be implemented and new documentation developed. The availability of an independent dose calculation system proved to be an efficient process for the large number of plans to be reviewed and checked under considerable time pressure.

Country

Australia

Institution

Peter MacCallum Cancer Centre

Author: KRON, Tomas (Peter MacCallum Cancer Centre)

Co-authors: FOX, Chris (Peter MacCallum Cancer Centre); GERONTZOS, Kosta (Peter MacCallum Cancer Centre)

Presenter: KRON, Tomas (Peter MacCallum Cancer Centre)

Session Classification: Session 11b - Quality in Radiotherapy: various dimensions

Track Classification: New Technologies in Radiation Oncology/Radiotherapy