Future Focused Radiation Oncology

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Service Improvement

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Deliver

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Summary

This project involved a multi-disciplinary approach implementing new radiation oncology through Artificial Intelligence (AI) treatment software. Radiation Oncology departments rely on a variety of specialties working together to provide high quality patient care. Embedded in this multidisciplinary team (MDT) environment are the complexities of radiation treatment planning and delivery. Once a

radiation oncologist prescribes radiotherapy to a patient, the patient will undergo a planning Computed Tomography (CT) scan, which is then imported into treatment planning software to create a unique radiation treatment plan to be delivered to the patient. One key step in this process is the act of contouring, which is the process of anatomical delineation, undertaken by highly trained radiation therapists and radiation oncologists. This contouring step will ultimately contribute to the accuracy of dose delivered, as well as the way in which the plan is assessed for quality. In early 2024 Radiation Oncology Princess Alexandra Raymond Terrace (ROPART) accepted, commissioned and implemented a state-of-the-art contouring software, MIM Maestro, which filled a technical gap in the existing treatment workflow. Such implementation required a robust commissioning approach from all teams involved, which included input from information technologists, physicists, oncologists and radiation therapists.

The commissioning process was split into a staged approach, with view to prioritise clinical implementation and improved processes. Through collaboration, MIM Maestro was successfully implemented in February 2024 after one month of planning, testing, system set up and infrastructure design, documentation and workflow discussions. The commissioning itself included regular MDT meetings and discussions to ensure each step was approached with consideration, and the entire team are very proud to now be working with MIM Maestro clinically.A new workflow for the department would include exporting the patient CT scans directly from the CT scanners into MIM Maestro, where diagnostic MRI or CT/PET images are fused to the planning CT in a fraction of the time it would previously take to further assist in tissue delineation. Simultaneously, automatically generated contours would be added to the patient CT scan, through MIM Maestro’s Contour Protege AI contouring solution. The act of automatically generating patient contours for the internal anatomy of a patient is a significant time save for the planning team, but also removes inter-user variability. In anticipation of MIM Maestro entering in the department, a team of IT specialists, radiotherapists, physicists and oncologists was established to ensure a streamlined, collaborative approach to MIM implementation. Timelines and tasks were divided appropriately and adjusted when required, through regular MDT meetings. Further to this, all specialties were invited to the vendor provided training and a master project management excel sheet was used to keep track of progress throughout the project. Commissioning tests included infrastructure set up, server creation and system install and configuration, data management and application deployment, data integrity testing, workflow commissioning, training and educational resource development and documentation across all levels, which ultimately resulted in a robust, expedient process.On all accounts, and from each specialty group, the MIM commissioning process passed all required tests. Any hurdles were dealt with on a case-by-case basis and implementation techniques were adapted as required. The first two weeks of patients were completed in February 2024 for the first oncology patient group, providing an opportunity for group reflection and adaption. Now that the initial implementation of MIM has successfully begun and brought together a MDT with a shared vision for its clinical application, the opportunity exists to pursue further avenues of automation and workflow improvement using this technology. An early benefit of this technology has been the reduction of manual processes within typical clinical workflows that would previously have taken up valuable clinical time. However, this powerful program provides the scope to evaluate multiple parts of the clinical workflow, and with an established team now formed and collaborating effectively, these areas of future development can be discussed and developed with confidence in the team's ability to execute these plans.

Key dates

Dec 2023

Implementation sites

Metro South Hospital and Health Service

Partnerships

MIM Support, Royal Brisbane and Women's Hospital MIM Team

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Aim

Streamlined, thorough and safe commissioning and clinical implementation of MIM Maestro contouring software solution at ROPART.

Benefits

The use of AI contouring reduces the time it takes for organ contouring, but the accuracy of the system itself is also improved through MIM implementation, ultimately resulting in more accurate treatments for patients. The success of this project is a testament to the multi disciplinary approach and will serve as a great case study as further technological advances are introduced into the ROPART oncology department. Specifically, the process itself has set a foundation to foreshadow the successful integration of new technologies set to arrive at ROPART in the near future. This will provide a structured approach that has been proven successful, and a suit of testing required to safely and efficiently implement new technologies.

Background

In 2021, a business case was initially proposed by the Radiation Oncology Cancer Care team at ROPART to consider the purchase and implementation of MIM Maestro, a modern contouring software solution that would provide capabilities beyond what was available to the ROPART radiation oncology department at the time. The business case outlined the efficiencies and cost savings that the software would bring to the department, and was ultimately successful, resulting in MIM Maestro being introduced to ROPART in late 2023. Until MIM Maestro arrived at ROPART, there had not been a dedicated contouring software solution in the department, with the contouring work instead being completed on the Treatment Planning System.

Solutions Implemented

A Treatment Planning System (TPS) often has contouring capabilities, but typically focuses towards the calculation of the radiotherapy plan itself. To this end, MIM Maestro was purchased to slot into the departmental workflow between the CT planning scan and the export to the TPS. IT infrastructure: specification review (business case items / server + client infrastructure needed / ordering) initial set up (Virtual server creation, Operating System installation and configuration), MIM Application installation and configuration; incl. Licensing, User authentication methods, import/export DICOM locations, application settings, backup implementation, ongoing clinical data management), application deployment.

Evaluation and Results

Due to nature of project, there are plenty of relevant numerical data that could be included. A summary of testing from the commissioning process is presented in the video submission. Ultimately, all commissioning tests passed, all DICOM data kept its integrity throughout the transfer between new and existing systems, contour integrity remained within 3% for volumes larger than 5cc, and the oncologists' evaluation of the new implementation has been only positive.Characterisation of the change in contour volume from MIM to the existing treatment planning system confirmed that for

small volumes less than 5 cubic centimeters, there was potential for up to 50% change in volume on transfer. This result informed the quality assurance process that would be in place to ensure all contours are checked after transfer into the treatment planning system.

Lessons Learnt

Change management and AI driven technology require:

- clear communication
- building a committee
- engaging stakeholders
- training and skills development
- monitoring and feedback
- setting realistic expectations

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