

Theme: Clinical

Abstract No.: PTCOG-AO2025-ABS-0148

Abstract Title: Automated Framework for Plan Review in Site-Specific Carbon-Ion

Radiotherapy using TPS Scripting

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## Background / Aims:

- Manual plan review is essential but time-consuming and inconsistent, especially in CIRT where beam-specific plans require extensive evaluation for each treatment.
- This study developed a carbon-specific automated plan review framework using scripting to standardize evaluations and reduce review time.

## Methods:

- The automated plan review framework focused on disease sites currently treated at Yonsei Cancer Center, including the liver, lung, pancreas, and prostate.
- Each plan was assessed for deliverability (e.g., mechanical collision, beam intensity interlock) and consistency between beams across all beam ports, following the specifications of the carbon-ion treatment system and site-specific clinical protocols.
- Upon plan completion, dosimetrists conducted the initial automated review and generated a report in the OIS, which was then double-checked by the chart review physicist.
- The system concurrently transferred the validated plan parameters to the hospital information system (HIS), where they were used for the treatment timeout.

## **Result:**

- Figure 1 shows an example of a plan review report verified by the physicist during the chart review.
- Figure 2 demonstrates how the system has enhanced the chart review process.
- Since its clinical implementation in May 2023, the automated plan review system
  has significantly decreased the time required for both plan and chart reviews.
- To date, all treatment plans validated through this system have achieved 100% deliverability on the CI-1000 carbon-ion beam delivery system.



Figure 1. Example of an archived review report. "Pass/Fail" items were automatically verified, but "Checked" items was reviewed by user.

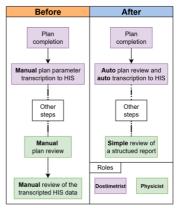


Figure 2. A simplified diagram illustrating the workflow before and after the adoption of the auto-plan review system.