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Clinical Implementation of a Quality Assurance Pipeline for an AI-Driven Auto-Segmentation Tool

10 Apr 2026, 15:00
1h 30m
Foyer Hörsaalgebäude & HSB 3 (Campus Technik)

Poster presentation
Radiation Therapy a...
Postersession & Coffe...

Speaker

Ariadna Cherit Hernández (Karl Landsteiner University)

Description

Background

AI has increasingly been integrated into radiation therapy planning to automate tasks such as tumour and organ-at-risk (OAR) segmentation, thereby reducing contouring time. Despite the availability of established performance metrics for AI models, standardized quality assurance (QA) protocols to ensure reproducibility and traceability in clinical settings remain lacking, potentially impacting treatment outcomes and regulatory compliance.

Materials and Methods
Robust QA protocols were developed to assess performance changes and ensure the reliability of TheraPanacea ART-Plan/Annotate, an AI-based tool for automated segmentation of OARs, following its clinical workflow integration at MedAustron. Forty OARs were selected based on an initial evaluation of ART-Plan version 2.1.0. Baseline and tolerance thresholds were established using the dice similarity index (DSI) and dose–volume histogram (DVH) parameters. Automated pipelines and a dedicated graphical user interface (GUI) were also designed for seamless integration into the treatment planning system (TPS) and to generate structured reports for traceability.

Results
Efficient evaluation and documentation within the clinical workflow using this framework, enabled a comparison between ART-Plan v2.1.0 and v2.2.1. The updated model demonstrated (DSI-based): (i) improved performance in 10/40 OARs, (ii) comparable performance in 20/40 OARs, and (iii) reduced performance relative to the previously available model in 10/40 OARs (see left side of table 1, with a tolerance of 0.01±1SD form baseline). For dosimetric evaluation, the unsigned relative differences between baseline and ART-Plan AI-generated contours were analysed using the near-maximum dose indicator D2, expressed as a percentage deviation (ΔD2[%]) with a tolerance of 1% difference with respect to the baseline (comparison is presented on the right side of table 1.

Conclusion
AI model upgrades should not be adopted blindly; they should undergo appropriate qualification and monitoring protocols, as the claimed improvements were not consistently reflected in the clinical data.

Short paper uploaded as attachment No

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Presentation materials

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