

AbstractID: 13685 Title: A Novel Method for Further Analysis of IMRT QA

Purpose: IMRT QA is often performed with a commercial device that compares 2D intensity maps to determine if a field passes certain dose and position criteria. The effect of an intensity map error on 3D dosimetry and DVH is clinically relevant but often not considered in IMRT QA. We herein exam the 3D dosimetric impact of IMRT failures measured with a 2D IMRT QA tool.

Methods and Materials: 22 IMRT plans had at least one field fail QA using MapCHECK 2, and these were further analyzed using in-house software to perform a DVH analysis. The MapCHECK 2 passing criteria was 95% of measured points had to be within 5% of the planned dose and have a distance-to-agreement of 4mm. Software was installed in our treatment planning system, PlanUNC, that reads intensity maps measured with the MapCHECK 2 and creates DVHs for 3D dose analysis. The software allows for field segment adjustment of MLC positions to address field edge failures and modification of prescribed MUs to address detector points that failed QA.

Results: Of the 22 plans that had a field fail initial QA with MapCHECK 2, it was determined that 16/22 and 3/22 plans were within 1% and 2% of the planned CTV and critical structure DVHs. 3/22 plans were found to have DVH differences greater than 2%, and MU values were therefore altered in the treatment plan.

Conclusions: Further analysis following an initial IMRT QA with the MapCHECK 2 is often needed to address the 3D dosimetric effects of the measured plan. Software has been installed into PLUNC that allows for 3D analysis for IMRT QA. Our analysis shows that using the MapCHECK 2 passing criteria of dose within 5% and 4mm DTA is sufficient, since 19/22 plans failing this criteria are within 2% of the planned DVH.