AbstractID: 3156 Title: Correlation between IMRT plan and delivery quality for 9 treatment planning systems

Purpose: This paper inter-compares measured vs. calculated IMRT verification data with the planning quality data from 9 treatment planning systems (TPS) to determine if the benefit of the TPS that generates the best plans on paper is realized when the dose is actually delivered.

Method and Materials: A collaboration of 8 centers with 9 TPS has previously presented results of a dosimetric comparison of IMRT plans using a consistent CT dataset for prostate, head and neck, and lung cases. Now these plans have been exported to phantoms and irradiated with the planned beams by each participating institution. Measurements have been made with an ion chamber at isocenter and film in a coronal plane 1 cm anterior to isocenter to determine the degree of agreement between the TPS dose and the measured dose. Also, the percentage of pixels exceeding a Gamma of 1.0 were tabulated for each system and site. A point system based on rank was applied to both Gamma values and absolute dose agreement for each system and site. The quality of the patient-based treatment plans was also quantified by a point system based on the ability to meet the stated dose-volume goals. The total points earned by the plans were correlated to the points earned by the QA results.

Results:. Both the mean and standard deviation of the differences between measured and calculated absolute dose were within 3%. There was no trend for the Gamma values by site and TPS. The correlation of plan quality and dose calculation accuracy was weak.

Conclusion: Although there were differences found in dose calculation accuracy between 9 TPS in both absolute dose and isodoses, there does not appear to be a correlation between plan quality and ability to deliver the planned doses.