AbstractID: 11217 Title: Investigation of Treatment Planning Parameters as a Corollary to IMRT Patient Specific QA passing rate for Treatment of Head and Neck Cancer

Purpose: Patient specific IMRT QA has been an integral part of the IMRT process in most institutions since the advent of IMRT. There has been the question whether we need to continue with this practice for every patient now that we have data for multiple similar cases. However, there have always been singular cases that fail IMRT QA criteria. This study looks to correlate treatment planning parameters and other metrics with the IMRT QA passing rate hoping to predict cases which may still require IMRT QA measurements. **Methods and Materials:** 15 head and neck treatment plans (101 total treatment beams) were delivered and analyzed using a 2-dimensional diode array (MapCheck®). Each treatment beam was analyzed using a gamma analysis with evaluation criteria of 10 percent threshold, 3 percent dose deviation and 3 millimeters distance-to-agreement as this is the standard for our institution. Parameters used to correlate with passing rate were: monitor units delivered, dose at isocenter, delivery efficiency (MU/cGy), number of segments, average leaf pair opening, and a 2-dimensional modulation index developed from the original Webb equation. **Results:** Univariate analysis showed no factors that correlated with passing rate. The R-squared values ranged from 0.0014 to 0.0565. MU number did have a p value of 0.016, but no other indicator of plan complexity predicted passing rate. **Conclusions:** This work demonstrates our attempt to show a relationship between IMRT QA passing rates and treatment plan parameters. We are unable to correlate any of these metrics with patient QA pass rate as specified. Treatment delivery uncertainties (e.g. flatness and symmetry) may play as pivot a role in QA passing rate as the treatment planning parameters used. Further investigation will involve combination of these uncertainties.