AbstractID: 8617 Title: Evaluation of accuracy of inhomogeneity corrections in IMRT planning

Purpose: Inhomogeneity corrections are commonly employed in computerized treatment planning. Among the methods of validating the accuracy of these corrections are measurements made in phantoms containing slabs of inhomogeneity using static fields. IMRT fields, because of presence of small segments, require a more robust inhomogeneity correction algorithm. The AAPM task group 65 report discusses the degree of accuracy of different algorithms employed in treatment planning systems in correcting for inhomogeneity. We have evaluated the accuracy of Philips Pinnacle^3 system in modeling the dose within and at the interface of inhomogeneities for IMRT plans. **Method and Materials**: The phantom used for evaluation is a modified IMRT QA phantom made by Civco. The phantom was modified by milling slots for TLD chips within the lung and bone-equivalent inserts, and near the interfaces with solid water. A seven-field IMRT plan was generated by optimizing to a spherical target within the phantom, between the lung and bone inserts. Three additional avoidance structures where added in order to achieve a realistic IMRT plan with significant modulation. The inhomogeneities were not used as constraints in the optimization. The planned IMRT was then delivered to phantom with calibrated TLD chips placed in a number of slots. The TLD readings for each location were then compared to the dose predicted at that point by Pinnacle. **Results:** The preliminary results of these measurements indicate satisfactory agreement between the measured and Pinnacle-predicted doses with some differences between the results for lung and bone. **Conclusion:** This work demonstrates the degree of accuracy of inhomogeneity correction for highly modulated fields in Pinnacle^3 system. More measurements are planned for other TLD points and additional work undertaken will compare the homogeneous and inhomogeneous plans in actual patients for different sites.