AbstractID: 5354 Title: Verification of the Lung Dose Calculation of a Commercial IMRT Planning System using a Realistic Lung Phantom

Purpose: The purpose of this work is to find out the accuracy of a popular IMRT TPS system (NOMOS CORVUS) in lung dose calculation.

Method and Materials: Up top now most of lung dose measurements have been done only for slab geometry of inhomogeneity and for a single beam. In this work, we use a realistic lung phantom and deliver all fields of realistic IMRT plans. The phantom is supplied with cylindrical inserts, made of equivalent materials of lung, bone, and tissue, which were used to load the dosimeters. The dose to phantom was calculated, for 16 IMRT plans, with the Corvus system. Verification was done with measurements using TLDs and ionization chambers measurement, as well as Monte Carlo simulation. For each treatment plan, the dose was verified at points located in lung, bone, and tissue.

Results: The comparison of the collected data shows that the dose to the lung calculated with Corvus was overestimated by 2% to 10% relative to the Monte Carlo results, and by 2% to 7% relative to the ion chamber measurements. The TLD measurements show better agreement to the Monte Carlo results than to the Corvus results. In bone and tissue the dose results show an agreement, within ±3%, among all the calculations and measurements.

Conclusion: The dose calculation accuracy in lung has been estimated for an IMRT planning system. It indicates that the dose algorithms have to be improved in order to have an accuracy of a few percent in lung.