

AbstractID: 2003 Title: A Monte Carlo Study on the Effect of Respiratory Motion on Lung IMRT Dose Distributions

In this study we investigate the effects of the respiratory motion on the planned dose distributions of lung patients treated with Intensity Modulated Radiation Therapy (IMRT) using Monte Carlo simulation. The 13 lung patients studied each has 3 CT data sets taken with free breathing, and with breath hold at the end of inhale and exhale. A commercial treatment planning software (HELIOS) was then used to make IMRT treatment plans based on the free breathing CT data of each patient. The fluence maps and beam setup parameters of the IMRT plan were then input in the Monte Carlo dose engine MCDOSE for dose calculation on the two breath hold CT scans. The dose distributions were then compared to evaluate the influence of the respiratory motion. The simulation results show that the CT volume with scored dose differences less or equal than 2% and 5% of planned dose are 84 % and 96% of the total CT volume, respectively. This result suggests that the lung IMRT dose distribution inside the patient is not very sensitive to respiration motion.