# AbstractID: 1160 Title: Effect of Voxel Size on Monte Carlo Dose Calculations

Monte Carlo dose calculations rely on patient CT data to provide 3D information of the anatomical structures. A typical CT image has a spatial resolution of 1 mm. In order to achieve the same accuracy as CT images ideally the voxel size used in Monte Carlo calculations should have the same CT resolution. Due to computing speed and memory limitations patient CT data are converted into Monte Carlo simulation phantoms with larger voxels. This work studies the voxel size effects on dose distributions for IMRT treatment planning. Patient CTs used for this study have 0.94 mm resolution with a 512x512 matrix. All the contours for the targets and critical structures were saved on the CT images. The patient CT data were converted into 256x256, 128x128 and 64x64 matrix CT phantoms respectively. We performed Monte Carlo calculations for 4 prostate cases using these three voxel sizes and the same plan generated by Corvus for each patient. Targets and critical structure volumes were compared. The maximum volume change between different voxel sizes was about 4% for the GTV. However there are less than 1% volume differences in GTV between 256x256 and 128x128 matrices. Isodose distributions and dose volume histograms (DVH) for the target and critical structure were compared. There were no significant differences (<3%) for DVH among the three voxel sizes. The changes in DVH between 256x256 and 128x128 matrices were negligible. The changes in iso-center position were also studied and their effects on IMRT planes are evaluated.