

AbstractID: 8694 Title: Calculation of Patient-specific Organ Doses from CT Exams

Purpose: To develop a Monte Carlo based package for calculating the patient specific organ doses from CT exams. **Method and Materials:** Clinical CT systems were simulated using the recently released Geant4 9.1 based on specifications provided by CT vendors. Continuous movements of CT gantry rotation and patient table translation were implemented. A text file was used to configure the scanner geometry and scanning protocols. The X-ray spectra were generated using the TASMIP program and were verified with the scanner HVL specifications. The simulation was at first validated by comparing the calculated CTDI100 with the measured value. The CT images of a CIRS anthropomorphic phantom were then used as a voxelized phantom and the CT # of each voxel was converted to a tissue composition based on the published data. Absorbed energy in each voxel was recorded and 3-D dose map was obtained. Organs were segmented manually and the dose for each organ was calculated. **Results:** The difference between the simulated CTDI100 and the measured value was less than 10%. A CT scan of a CIRS anthropomorphic phantom was simulated and doses to each organ were calculated. **Conclusion:** It is feasible to calculate organ doses for individual patient based on clinically acquired CT images and scanning parameters. Automated segmentation tool is needed to make the organ dose calculation to be practical.