

AbstractID: 10869 Title: Evaluation of an Anthropomorphic Pelvis Phantom for Proton Therapy

Purpose: To design and implement an anthropomorphic pelvis phantom to audit proton therapy treatment procedures.

Method and Materials: A pelvis phantom already in use for independent audits of photon IMRT treatments was retrofitted for use with protons. The relative stopping power of each material used to construct the phantom was measured. Hounsfield Units were determined for each material with a clinical CT scanner. The tissue equivalence of the materials was determined by comparing with the CT calibration curve used clinically for human tissues. A CT simulation of the phantom was then performed and a proton treatment plan was devised. TLD and radiochromic film were inserted in the phantom and the treatment plan was delivered. The measurements from the TLD and film were compared to calculations made with the treatment planning system. Profile plots through the coronal and sagittal planes were compared to confirm agreement between the treatment plan and delivery. **Results:** Measured relative stopping powers differed by as much as 10% from values used by the planning system. The comparison between the plan and the TLD showed a difference in dose of less than 3%. The film showed a 2 mm shift in the anterior-posterior profile and a 6 mm shift in the superior-inferior profile. The width of the delivered high-dose region shown by the right-left film profile differed by as much as 8 mm compared to the plan profile. **Conclusion:** Preliminary results show the phantom will be able to confirm agreement between measured and calculated dose within 5%/3mm. Stopping power differences between tissue and phantom materials might account for discrepancies between the treatment plan and delivery in the left-right direction, as lateral fields were used. **Conflict of Interest:** Work supported by PHS CA010953 and CA081647, awarded by NCI, DHHS, and funds from the RTOG.