AbstractID: 13853 Title: Comparison of Model-Based Segmentation Systems for Contouring of Male Pelvic Structures

Purpose: Manual delineation of structures for radiation therapy treatment planning often is a laborious and time consuming process, particularly with IMRT, adaptive planning, and 4D CT data sets. In this study, two model-based segmentation (MBS) systems are compared and evaluated for contouring of structures in the male pelvis. **Method and Materials:** Two commercially available MBS systems, Oncentra (Nucletron, Veenendaal NL) and Pinnacle (Philips Medical Systems, Madison WI) are used to delineate structures of the male pelvis for radiation therapy treatment planning. Five patients undergoing prostate IMRT treatment were randomly selected and contoured in Pinnacle using non-MBS tools; this is considered the benchmark. Contours were also generated using both MBS systems and subsequently corrected using manual non-MBS tools that are similar to both Oncentra and Pinnacle. Contouring times and volumes for both MBS systems were compared and evaluated against the benchmark non-MBS contours. **Results:** The average time to contour male pelvic structures with non-MBS tools was 14.93 minutes. Using MBS, this was improved by 25.0% in Oncentra and 30.1% in Pinnacle. The mean reduction in time contouring using MBS with Oncentra and Pinnacle, respectively, was 2.8%±24.0 and 10.5%±15.5 for the prostate, 18.5%±24.0 and 25.5%±17.1 for the bladder, 2.6%±12.2 and 7.2% ±8.6 for the rectum, and 42.1%±15.1 and 45.4%±13.4 for both femurs. Using the MBS technique in Oncentra and Pinnacle, 28.9% ±8.0 and 31.6%±5.5 of the respective total contouring time was spent generating the MBS contours and the remainder of editing with non-MBS tools. Contour volumes were similar for the benchmark and the MBS systems. **Conclusion:** Both MBS systems require manual editing of auto generated contours to better match the benchmarks. Nevertheless, the MBS systems resulted in similar time savings over utilizing only non-MBS tools when delineating structures of the male pelvis for radiation therapy treatment planning.