AbstractID: 11531 Title: The effects of additional scatter media and tube current modulation on MDCT organ doses

Purpose: To quantify the effect of scatter media surrounding the scanned volume in CT on organ dose. This information could prove valuable in using patient specific data with Monte Carlo simulations to determine clinical organ doses. The effects of beam width and automatic tube current modulation (ATCM) on organ doses in CT were also explored, as most current Monte Carlo simulations do not account for the ATCM systems incorporated in modern clinical scanners. **Method and Materials:** Average organ dose measurements were taken in an adult male anthropomorphic phantom using a fiber optic coupled dosimetry system during a routine clinical chest CT exam. The amount of scatter media was increased longitudinally from a normal 33 cm scan length to include the entire 176 cm length of the phantom. Both modulated and fixed tube current scans were performed using multiple beam widths (2.4 mm and 1.2 mm) to determine the effects of these parameters on organ doses. **Results:** Within experimental error, the presence of additional scatter media did not cause an increase in measured doses. A 2.4 mm beam produced an 11% dose reduction as compared to a 1.2 mm beam. ATCM was found to reduce average organ doses by approximately 24%, with individual organ dose reductions ranging from 36% in the breast to 10% in the lungs compared to fixed current scans. **Conclusion:** Monte Carlo simulations performed on patient scan data will not significantly underestimate organ doses due to scatter contribution from outside the scan volume for an average-sized patient. A combination of ATCM and a wider beam was found to reduce average doses by 33% during a chest CT. It was found that a comparison of the ATCM tube current per slice is an accurate predictor of individual and average organ dose savings for ATCM compared to fixed current techniques.