

AbstractID: 8768 Title: The effect of measurement location on in-air CTDI values

Purpose: To experimentally investigate the variation of $CTDI_{air}$ with radial distance from the scanner isocenter.

Method and Materials: Radiation dose measurements were obtained on a Siemens Sensation 16 CT scanner operated with both the head and body beam filtration filters. Measurements were made of $CTDI_{air}$ (mGy/mAs) as a function of the radial distance r from the CT scanner isocenter. The radial profile $CTDI_{air}(r)$ was fit to a third order polynomial which permitted the average CTDI over any radius to be obtained analytically.

Results: At $r = 8$ cm, values of $CTDI_{air}$ relative to the isocenter were 0.824 and 0.838 for the head and body filters, respectively; at $r = 16$ cm, the values of $CTDI_{air}$ relative to the isocenter were 0.521 and 0.546 for the head and body filters, respectively. Values of $CTDI_{air}$ averaged over an 8 cm radial distance were $\sim 0.91 \times CTDI_{air}(0)$, and averaged over a 16 cm radial distance were $\sim 0.74 \times CTDI_{air}(0)$.

Conclusion: Quantification of variations of $CTDI_{air}(r)$ are of interest because: (a) this parameter quantifies the performance and effectiveness of beam shaping filters; (b) $CTDI_{air}$ data can be used to obtain Tissue Air Ratios that can estimate organ doses in CT.