

AbstractID: 2780 Title: Comparison of Radiation Dose Indexes For CT Scanners:  
Measured verses Automated Scanner Calculations

**Purpose:** Modern CT scanners provide radiation dose indexes such as CTDI and DLP for every patient based upon the selected scan parameters. Our goal is to study the potential sources of errors for these automated calculations.

**Method and Materials:** The measured and automated radiation dose indexes were compared on five different CT models from two manufacturers. Acrylic cylindrical phantoms with diameters ranging from 6 – 32 cm were utilized for the study. Measurements were made at all available kVp's and typical scan techniques in both axial and helical modes. The measured CTDI and DLP values were compared with the displayed automated values.

**Results:** The automated displayed CTDI and DLP values are derived from system calibration using fixed size phantoms representing a typical adult head (16 cm) and adult body (32 cm). They vary with parameters such as kVp, mAs, pitch, x-ray beam collimation and selected protocols. For typical adult head, our measured CTDI and DLP values agreed with the automated values to an average of 7.8% discrepancy. Similarly, an average of 14% discrepancy was observed for typical adult body. However, the discrepancies widened significantly for those measured on other sizes. For pediatric body scans using a 16 cm diameter phantom on table top, the measured CTDI values are more than doubled compared to the displayed automated values.

**Conclusions:** It is important to realize that the automated radiation dose indexes by CT scanners only represent estimates based upon standardized adult body and head sizes. No considerations are given to patient age, size, weight and tissue composition. Especially, the values for pediatric scans are not represented correctly by the automated CTDIs. Future calculated radiation dose assessments needs to be incorporated with more patient factors.