AbstractID: 9700 Title: The Relationship between Half Value Layer and CTDI for Multidetector CT (MDCT)

Purpose: CTDI is a common measurement for MDCT, but Half Value Layer (HVL) is not routinely measured. The purpose of this study was to determine the relationship between these two measured values for different scanners at different beam energies, specifically to determine if HVL alone is an adequate predictor for CTDI values. **Method and Materials:** CTDI measurements ($CTDI_{100,\ periphery}$, $CTDI_{100,\ center}$ and $CTDI_w$) were performed using the 32 cm diameter (body) phantom on MDCT scanners from three different manufacturers, using similar collimation settings. CTDI values were reported on a normalized (per mAs) basis. The HVL was obtained using a static (nonrotating) tube. CTDI and HVL were measured for each available beam energy and bowtie filter (for body scanning) for each system. **Results:** Normalized $CTDI_w$ values ranged from .019 to .134 mGy/mAs across all scanners, kVps and bowtie filters with a mean of .071 mGy/mAs. HVLs ranged from 4.5 to 9.7 mmAl across scanners, kVps and bowtie filters with a mean of 7.3 mmAl. For a given kVp (e.g. 120 kVp) the normalized $CTDI_w$ ranged from .065 to .096 mGy/ mAs with an average of .081, while the HVLs ranged from 6.6 to 8.6 mm Al with a mean of 7.9 mmAl. In general, for a given kVp, the systems with lower HVL tended to have higher $CTDI_w$ values. **Conclusion:** There is significant variation in normalized $CTDI_w$ values and HVL values across scanners and even bowtie filters within a scanner. However, higher HVL values yield lower $CTDI_w$ values. Thus, for a given scanner and bowtie filter selection, there does seem to be a relationship between HVL and CTDIw, but these latter values can also be influenced by other factors such as filtration not accounted for by HVL (filtration in bowtie not through the central ray) as well as beam collimation.