

AbstractID: 13914 Title: The effects of patient size on organ doses in adaptive tube current modulated CT

**Purpose:** To quantify the effect of patient size on organ doses in tube-current modulated CT. Adaptive tube-current modulation technologies adjust tube output in response to patient attenuation based on user inputted image quality settings. As such, organ doses can vary widely depending on patient size for the same scanner techniques. This project aims to quantify these changes in dose for a variety of exams. **Method and Materials:** An adipose tissue-equivalent add-on was developed for an existing anthropomorphic adult phantom, allowing for average organ doses to be measured in both a 50<sup>th</sup> and 90<sup>th</sup> percentile by weight patient. The doses were measured using a fiber-optic dosimetry system during routine clinical CT exams of the chest, abdomen and pelvis. Exams were performed using the same quality reference mAs for both phantoms on a Siemens 16 slice scanner and the resulting organ doses were catalogued for comparison. **Results:** Overall, organ doses were seen to increase in the larger phantom for similar exam techniques. These differences were greater in areas where the additional adipose tissue was thicker, resulting in increased tube output in order to maintain image quality. The average organ dose increase seen in the chest, abdominal, and pelvic exams was found to be 10.5%, 22.2%, and 37.34% respectively, with individual organ dose increases as high as 78%. Additionally, due to increased patient medium and scatter, noise in images from the larger phantom exams was found to be 10-15% higher as compared to the smaller patient. **Conclusion:** Individual organ doses were seen to increase up to 78% in a larger patient for the same exam techniques as a result of adaptive tube-current modulation. These increases were coupled with reduced image quality due to scatter. The effects of patient size on doses in tube-current modulated CT exams should be noted when setting patient protocols.