

AbstractID: 13971 Title: The effects of incorrect choice of patient size references (Adult/Child) on tube current modulation

**Purpose:** To investigate the effects of choosing incorrect patient size references on tube current modulation schemas. **Method and Materials:** To explore the performance of the tube current modulation algorithm, two phantoms were scanned under multiple conditions. One of the phantoms used is an anthropomorphic adult male thorax phantom. To represent a relatively smaller, inhomogeneous pediatric patient, a small QA phantom was chosen. Both phantoms were scanned using two different patient size references (70 kg Adult and 25 kg Child). For all four options two scans were performed, one using an adult chest protocol parameters (120 kVp and 250 mAs) and one using a pediatric chest protocol parameters (100 kVp and 55 mAs). A Monte Carlo simulation was used to calculate radiation dose to lungs resulting from each scan.

**Results:** For both phantoms the average effective mAs increased when the reference was changed from adult to child, while the protocol was kept constant. The radiation dose to lungs increased by almost 40%, when the thorax (adult) phantom was scanned using the incorrect reference (25 kg/peds) with the adult chest protocol parameters. The opposite was observed when the QA (peds) phantom was scanned using the incorrect reference (70 kg/adult) along with the pediatric chest protocol. In this case the radiation dose to lungs decreased but the standard deviation increased by almost 92%. **Conclusion:** Using an incorrect patient size reference can, depending on the situation, either significantly increase the dose to the patient or dramatically decrease the dose, resulting in noisy images (which may not be of diagnostic quality). Therefore it is important to use the appropriate patient size reference along with an appropriate protocol to make best use of tube current modulation algorithm.