

AbstractID: 14585 Title: Optimizing CT Dose and Image Quality for Different Patient Sizes

CT technology has improved dramatically over the past decade and its clinical utilization has increased significantly as well. While CT can yield exquisite descriptions of anatomy that were not previously possible (at least not with noninvasive techniques), its increased utilization has led concerns over radiation dose; CT has now been identified as the single largest contributor to medical radiation dose to the population and accounts for approximately 50% of medical exposure. Methods to reduce radiation dose have been the focus of all stakeholders (medical physicists, technologists, radiologists, manufacturers and regulators). Reducing dose while maintaining acceptable image quality can be complex and this is made even more complex when considering patients of different sizes.

This talk will first describe methods currently used, and some being developed, to estimate radiation dose in patients. This will include a discussion of measurement techniques as well as Monte Carlo simulation-based techniques. Specific attention will be paid to the differences in dose to patients of different sizes ranging from pediatric patients to obese adult patients. Tradeoffs in image quality and radiation dose will also be described in this context as well. Radiation dose reduction techniques, including a review of various tube current modulation schemes currently being employed will also be described. The effect of these dose reduction methods on both radiation dose and image quality will be discussed, again with attention to how they can be deployed with patients of different size.

Learning Objectives:

1. Understand how radiation dose for CT studies is currently estimated
2. Understand the trade-offs of dose and image quality, especially for large (obese) patients and in pediatric patients
3. Review of the manufacturers' dose modulation methods and how these affect dose in different patients