

Development of pediatric CT scan protocols that simultaneously provide sufficient image quality for diagnostic tasks, while delivering a minimal radiation exposure, continues to be a challenge for medical physicists across the nation. Radiation dose concerns are more serious for pediatric patients because they are more sensitive to radiation and will have many decades in which to develop medical conditions sparked by a childhood CT exam. This situation is further magnified because the applications of this imaging modality continue to expand, bringing even more pediatric patients into our CT clinics.

This course will explore several strategies for reducing radiation exposure. Our experience in this regard will be thoroughly described. We have utilized a family of pediatric and adult anthropomorphic phantoms, and skin dose detectors, along with a multi-row CT scanner, in order to examine the effect of body size and scan technique on entrance exposure. We estimated the nominal noise level in the adult CT exam with our typical routine protocol settings, and aimed to deliver that same level of noise in our pediatric CT exam results. Adjusting the combination of kV, mA and pitch resulted in a set of pediatric CT technique charts which continue to be revised. The clinical impact of implementing these new parameter settings (including reducing kV) will be presented.

CT images that reflect our evolving pediatric CT technique will be discussed. Several example pediatric CT protocol charts from major institutions will be provided for reference. Potentially extending these methods to adult CT scanning will also be discussed.

Educational Objectives:

1. To appreciate the importance of adjusting CT technique parameters for pediatric patient populations.
2. To understand how to approach developing pediatric CT technique charts for your own facility.
3. To comprehend the key parameters to adjust and the potential ranges of parameter settings for pediatric CT imaging.