Selected Research Support for MITA Smart Dose Features

**Pediatric and Adult Reference Protocols**

- Low Dose CT protocol produced an average dose reduction of 91%, compared to standard-dose CT protocols, while remaining accurate enough for resolving certain clinical questions common in the intensive care patient.

- Substantial dose reduction and high compliance can be obtained with pediatric CT protocols tailored to clinical indications, patient weight, and number of prior studies. For chest CT, there was 52.6% to 85.4% dose reduction in the early stage of implementation and 73.5% to 83.2% dose reduction in the later stages compared with dose at noncompliant examinations, with no loss of clinically relevant image quality. For abdominal CT, there was 34.3% to 80.2% dose reduction in the early stage of implementation and 62.4% to 83.8% dose reduction in the later stage.

- Abdominal low-dose CT protocol providing 82% less radiation dose compared favorably with standard-dose CT protocol in patients with suspected renal colic. Low-dose CT achieves sensitivities and specificities close to those of standard-dose CT in assessing the diagnosis of renal colic and correctly identifying alternative diagnoses.

- The low dose protocol provided diagnostically acceptable images for at least 99% of patients and achieved mean dose reduction of 55% compared with the standard dose protocol.

- Protocols reduced the effective dose by 42% for three-phase CT urography. Diagnostic confidence in low-dose images was equal to that in normal-dose images.

- Adjusting the CT protocol by selecting parameters according to patient weight decreased dose—the largest average dose impact was a 13.9% dose reduction by one measure and 16.1% dose reduction by another measure. The largest reductions occurred in the patients weighing less than 250 lb.

**Automatic Exposure Control**

- AEC technology led to as much as a 35% reduction in the CT radiation dose, without sacrifice of low-contrast detectability.

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2 Research findings are paraphrased in this document, with links provided to the original articles.

- AEC application yielded dose reductions between 27% and 40%. The dose to patients undergoing a MDCT examination can be reduced considerably by applying a current-modulated AEC.

- AEC resulted in a substantial dose reduction. AP-AEC scan dose reductions ranged as high as 34.7% (neonates), 30.9% (1 year old), 26.7% (5 years old), 58.7% (10 years old), and 57.4% (adults). LAT-AEC scan dose reduction ranged as high as 36.5% (neonates), 35.7% (1 year old), 35.6% (5 years old), 67.0% (10 years old), and 61.7% (adults).

- AEC technology enables relevant radiation dose reduction of approximately 27% in chest CT while keeping image quality parameters at high levels.

- Utilization of AEC technologies can reduce radiation dose by 10% to 60% in most instances.

- AEC technologies have demonstrated 20% to 40% radiation dose reductions.

- AEC technology with adequate noise characteristic leads to significant reductions in radiation exposure for patients while maintaining excellent image quality, with demonstrated average dose reduction of 36% in chest scans and 17% in abdomen/pelvis scans.

- When performing anteroposterior (AP) abdomen and AP pelvis examinations, radiographers can reduce patients' entrance skin radiation dose exposure and maintain image quality by selecting the two outside AEC chambers.

- AEC techniques aid in radiation dose optimization at a selected image quality.

- An automatic exposure control mechanism that is based on real-time anatomy-dependent tube current modulation delivers good image quality with a significantly reduced radiation dose.
**Dose Check**

- What is obvious today is that the radiation dose you end up with depends to a certain extent on how the equipment is designed and built. The recent availability of dose alerts and notifications prior to scanning can also prevent excessive doses during CT examination.

- Compliant scanners allow users, before proceeding with scanning, to confirm or correct settings that might otherwise lead to unnecessarily high exposures.
  - American Association of Physicists in Medicine. AAPM Recommendations Regarding Notification and Alert Values for CT Scanners. 2011 April – [Link](#)

**DICOM Dose Structured Reporting**

- DICOM SR improves patient care and is essential for the inclusion of radiology information in deployment of Electronic Health Records.

- DICOM SR provides significant new opportunities for large-scale collection of data for clinical research, training, and outcomes assessment as a routine by-product of diagnostic imaging procedures, facilitating the pooling of data for multi-center clinical trials and evaluations.