



New Software Controls CT Radiation Exposure in Children



Patients at Cincinnati Children's Hospital Medical Center are being exposed to significantly less radiation during CT scans because of new technology that allows doctors to more tightly control radiation doses. The innovative imaging software reduced overall radiation exposure from CT scans by 37 percent, according to two new studies published online in the journal *Radiology*.

The imaging software – developed and currently in use only at Cincinnati Children's – mathematically determines the lowest possible radiation dose for the patient before a scan is performed, according to the study led by David Larson, MD, radiology quality and safety director at the medical center and principal architect of the technology.

Used with existing CT scanners, the new software allows radiologists to precisely control the amount of radiation based on the specific size of each patient, while still producing diagnostic-quality images. The software provides radiologists with the correct scanner settings before the CT scan is performed, and then monitors each scan slice-by-slice, to confirm that the right dose was used.

"Radiologists have had to rely on a trial-and-error approach to optimising CT radiation dose. This model allows us to more accurately walk that fine line of precise dosing," said Dr. Larson. "Even though modern CT scanners adjust the dose based on the size of the patient, they do not necessarily adjust it to the exact image quality radiologists need. This way we can not only specify what image quality and dose are appropriate, but we can also predict the scanner settings needed to achieve those levels."

During the quality-improvement study involving more than 800 patients, Dr. Larson and his team asked radiologists to score CT images to determine an acceptable amount of "noise" – or unwanted random signals.

"Image quality is what determines the appropriate radiation dose – the challenge is to find the threshold where the dose is as low as possible, but the images are still clear," Larson added. "The right balance results in images that may be a little noisy but are good enough to provide an accurate diagnosis."

Larson believes the new system can have broad-scale impact on how CT scans are performed. He adds that though the approach was developed in paediatrics, it is also applicable for adults.

"Image quality depends on patient size, not patient age," Larson said. "58 percent of the examinations in our study were of adult-sized patients."

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