

AbstractID: 6738 Title: Performance evaluation of an 85 cm bore x-ray computed tomography

The demand for CT virtual simulation is constantly increasing with the wider adoption of three-dimensional conformal and intensity modulated radiation therapy. Virtual simulator (VS) CT studies are typically acquired on conventional diagnostic scanners equipped with an external patient positioning laser system and a specialized visualization planning software. VS technology has matured to a point where conventional simulators may be replaced with CT scanners. However, diagnostic CT scanner gantry bore (typically 65-70 cm) can present an obstacle to the CT simulation process by limiting patient positions, which can be attained in a conventional simulator. Breast cancer patients cannot always be scanned in a comfortable treatment position. Extremely large patients, patients requiring special immobilization or large setup devices are often unable to enter the limited bore gantry. A dedicated 85 cm bore radiation oncology CT scanner has the capability to avoid these problems. The scanner should provide for diagnostically comparable images at diagnostic comparable dose levels. The purpose of this study was to independently evaluate the performance of a novel 85 cm bore computed-tomography (CT) x-ray scanner designed specifically for radiation oncology. Commercially available image quality performance phantoms were used for scanner evaluation. The computed-tomography dose index was measured for standard imaging protocols. Test results were compared with current available data on conventional design 70-cm bore diagnostic scanners and with manufacturer performance test results, validating its use for routine quality assurance. The overall imaging performance and mechanical integrity of the 85 cm bore scanner was comparable to conventional diagnostic scanners.