
RSNA Press Release

Full-Body CT Screening Increases Risk of Cancer Death

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OAK BROOK, Ill. - The risk of cancer mortality from a single full-body computed tomography (CT) scan is modest, but not negligible, and the risks resulting from elective annual scans are much higher, according to a study published in the September issue of the journal *Radiology*.

The increasing popularity of elective, or self-referred, full-body CT screening has raised concerns regarding the radiation-related cancer mortality risk associated with full-body CT radiation exposure. Based on anecdotal evidence, these scans are performed on asymptomatic people to identify a variety of diseases, including colon and lung cancer and coronary artery disease.

"Our research provides definitive evidence that radiation risk is associated with full-body CT scans," said David J. Brenner, Ph.D., D.Sc., lead author of the study and professor of radiation oncology and public health at Columbia University Medical Center in New York City. "The radiation dose from a full-body CT scan is comparable to the doses received by some of the atomic-bomb survivors from Hiroshima and Nagasaki, where there is clear evidence of increased cancer risk." The researchers studied low-dose A-bomb survivors, not high-dose survivors.

Two experts square off on this controversial topic. [Click here to get their views.](#)

The researchers estimated cancer mortality risk associated with single and multiple full-body CT scans by comparing A-bomb cancer mortality data with the calculated effective radiation dose (weighted average over all relevant organs) from a full-body scan. The dose from a single full-body CT is only slightly lower than the mean dose experienced by groups of A-bomb survivors, in whom significant increases in cancer risk are seen. The effective dose of radiation delivered during a full-body CT exam is nearly 100 times that of a typical screening mammogram.

At A Glance

- Even a single full-body CT screening exam can increase a person's risk of death from cancer.
- Cancer risk increases exponentially with each subsequent screening.
- The radiation dose from a full-body CT screening exam is comparable to that received by Hiroshima and Nagasaki low-dose A-bomb survivors.
- The report considered risk only for asymptomatic adults undergoing elective scans. In patients referred for medical diagnoses, the benefits typically considerably outweigh the risks.

The study found that a 45-year-old person who underwent one full-body CT screening would have an estimated lifetime cancer mortality risk of approximately 0.08 percent, which would produce cancer in one in 1,200 people. However, a 45-year-old who has annual full-body CT scans for 30 years would accrue an estimated lifetime cancer mortality risk of about 1.9 percent or almost one in 50.

The report considered risk only for asymptomatic adults who elect to undergo high-tech checkups. "The risk-benefit equation changes dramatically for adults who are referred for CT exams for medical diagnosis. Diagnostic benefits far outweigh the risks," Dr. Brenner said.

The controversy surrounding elective full-body CT screening has been focused primarily on disease detection versus risk of false-positive findings, while neglecting the potential radiation risks associated with CT scans. CT delivers much larger radiation doses to the organs than do conventional x-rays.

"In addition to the radiation risks demonstrated in this report, elective full-body CT may provide false-positive findings when no disease exists," Dr. Brenner said. "This typically involves more extensive testing, which is costly and stressful." No studies have yet reported life-prolonging benefits to the procedure.

The risk from ongoing, elective CT screenings can be reduced by increasing the time between scans or by starting at a later age. The researchers note that different CT scanners will produce different doses and, consequently, different risks. Full-body CT protocol is not standardized, so radiation exposure may vary among centers.

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["Estimated Radiation Risks Potentially Associated with Full-Body CT Screening."](#) Collaborating with Dr. Brenner on this paper was Carl D. Elliston, M.S.

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