Dosimetric Impact of a New Computational Voxel Phantom Series for the Japanese Atomic Bomb Survivors: Methodological Improvements and Organ Dose Response Functions

Epidemiological studies of A-bomb survivors conducted by RERF provide some of the most important data for developing worldwide radiation protection guidelines. These studies rely on accurate estimates of the radiation doses that survivors received. The doses are obtained with complex computer computations that depend on mathematical representations of the human body. These mathematical models are called "phantoms."

A joint Japan-U.S. team of scientists—from RERF, the Japan Atomic Energy Agency, the University of Florida, and the U.S. National Cancer Institute—has developed new and more sophisticated phantoms representing accurate physical dimensions of Japanese people living in 1945. Based on the new phantoms, the team employed modern and powerful computational methods to reassess the radiation doses received by A-bomb survivors.

The new phantoms have the potential to provide more accurate estimates of doses for nearly all organs within the body for the full age-range of survivors, from fetuses to adults, for both sexes, including pregnant females. This new method of computing radiation doses for A-bomb survivors, if adopted, could allow further refinement of results obtained from RERF studies.

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RERF's objective with this brief outline is to succinctly explain our research for the lay public. Much of the technical content of the original paper has been omitted. For further details about the study, please refer to the full paper published by the journal.