

HPS Responds to CT Article

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In the 29 November 2007 issue of the *New England Journal of Medicine* (NEJM) 357:22, Drs. David Brenner and Eric Hall authored an article titled “Computed Tomography—An Increasing Source of Radiation Exposure” that discussed possible risks associated with the increasing use of CT scans for medical purposes. While the authors raised some valid points, there were other points with which I had some concern. In light of that, we developed a response to the article that was shared with the HPS membership, the American Association of Physicists in Medicine, and the American College of Radiology and a shortened version that was sent as a letter to the editor of NEJM. Because of its relevance to the health physics community, we are sharing with you the regular version of the HPS response.

As D.J. Brenner and E.J. Hall state in their article “Computed Tomography—An Increasing Source of Radiation Exposure,” which was published in the November 29, 2007 issue of the *New England Journal of Medicine*, there has been a large rise in the use of CT exams for medical diagnosis and, in some cases, for cancer treatment follow-up. The radiation dose associated with CT scans is not insignificant. Manufacturers and medical and health physicists continue their efforts to reduce these radiation doses while still obtaining a high-quality diagnostic image. The Health Physics Society (HPS)¹ agrees with the conclusions of the authors that (1) patient dose should be reduced as much as is practical, not only from CT scanners but from any type of radiation-generating device, (2) when diagnostic results are comparable, nonionizing methods should be used to obtain diagnostic information, and (3) CT scans should only be used when justified.

However, the HPS, a not-for-profit scientific organization composed of approximately 5,500 radiation protection professionals, disagrees with the authors on a number of key points.

The authors use dose-response information from the atomic bomb survivors to calculate risk for patients undergoing CT procedures. Although the authors indicate “there is little evidence that the risks for a specific organ are substantially influenced by exposure of other organs to radiation,” there still exists much controversy within the radiation biology field regarding differences in whole-body exposure (e.g., atomic bomb survivors) and individual organ exposures (e.g., patients undergoing partial-body CT scans). In addition, the cancer risk coefficients applicable to the Japanese population in 1945 may vary significantly from those

experienced by a United States population more than 60 years later.

While the HPS appreciates the need to continue to reduce radiation doses from medical exams, the risks of health effects for lifetime radiation doses below 0.1 Sv are too small to observe or are nonexistent. Collective dose (dose to a person multiplied by the potential number of persons exposed) is a highly speculative and uncertain measure of risk and should not be used at this dose level for the purpose of estimating population health risks (see the HPS position statement on radiation risk in perspective at http://hps.org/documents/risk_ps010-1.pdf).

The HPS believes that no medical use of radiation should be employed unless there is a clear medical benefit (see the HPS position statement on CT screening at http://hps.org/documents/ctscreening_ps018-0.pdf). Medical CT exams must be prescribed by a physician for a justified purpose. It is unacceptable to use medical exams involving radiation when there is no justification for the exams and without regard for the radiation risks imposed (ICRP 1991).

The medical use of CT exams is necessary and is lifesaving. The detection of coronary artery disease, cancer at an early stage, and other life-threatening illnesses allows for better patient management and care and allows individuals to improve their health through early detection and intervention and possible proactive lifestyle changes.

Reference

International Commission on Radiological Protection. 1990 recommendations of the International Commission on Radiological Protection. Oxford: Elsevier; ICRP Publication 60; Ann ICRP 21; 1991.

¹ The Health Physics Society is a nonprofit scientific professional organization whose mission is excellence in the science and practice of radiation. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. The Society may be contacted at 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101; phone: 703-790-1745; email: HPS@BurkInc.com. ☒