

February 1, 2014

### **CT Scans Save Lives**

We are writing to express our concerns with a January 30, 2014 article by Rita F. Redberg and Rebecca Smith-Bindman. The article is alarmingly titled, “We Are Giving Ourselves Cancer”, and is accompanied by a frightening cartoon that appears to be a doctor holding an X-ray film, and wearing a gas mask and helmet. The picture and title are the first clues that sensational claims follow, and the article does not disappoint in that regard, though it falls far short in offering prudent medical advice to frightened patients and parents.

The authors only mention in passing that medical imaging can save lives, and quickly move on to assert that there is little evidence of better health outcomes from current scanning practices. They do not mention, for example that the National Lung Screening Trial recently found that former smokers who received CT screening were 20% less likely to die from lung cancer and 7% less likely to die from any cause, compared to those who were screened with lower dose chest radiography. They do not mention the studies demonstrating the clear clinical benefits of mammography, bone mineral densitometry, and CT colonography. They do not mention the hundreds of studies that suggest that the body’s natural defense systems are quite capable of dealing with very low doses of radiation – like those that have existed on our planet since its beginning and those associated with modern medical imaging. They do not mention the hundreds of other studies that suggest that low radiation doses may in fact stimulate patients’ natural defenses against cancer (many of which can be found at <http://radiationeffects.org>). Instead, the authors claim that we are “irradiating ourselves to death” with medical diagnostic imaging, especially CT scans. They selectively cite two recent studies of children who received CT scans, both of which claim to observe increased cancer rates, which the authors claim is due to radiation from the scans. Unfortunately, these studies suffer from a number of methodological problems, including:

- (1) The studies lacked proper controls. They should have included children who did not receive CT exams, but who had the same medical conditions as the children who did receive CT scans. This could lead to the erroneous conclusion that the CT scans caused cancer, when in fact the cancer was caused by the underlying medical condition that required the scan. For example, the most common reason for CT scans in children is head trauma – which itself has been linked to later cancer.
- (2) The studies used questionable models to estimate risks. Risk estimates were based on the linear, no-threshold model of radiation risk – a controversial model used for conservatively setting radiation protection standards, but which is inappropriate for estimating excess cancers from CT scanning.
- (3) The studies used questionable methods to estimate radiation dose received by patients. Radiation doses were not directly measured. Rather, age-based estimates were used that assumed, for example, that a newborn infant is the same size as a 4-year old child. As any parent knows, this is simply not true, and this could lead to large errors in dose estimates.

The authors’ unsubstantiated predictions of excess cancers caused by CT scans are far outside the scientific mainstream. The American Association of Physicists in Medicine (AAPM) - which

is the professional society for physicists with expertise in medical imaging - has stated that the risks of medical imaging procedures “are too low to be detectable and may be nonexistent”. The AAPM also stated,

“Predictions of hypothetical cancer incidence and deaths in patient populations exposed to such low doses are highly speculative and should be discouraged. These predictions are harmful because they lead to sensationalistic articles in the public media that cause some patients and parents to refuse medical imaging procedures, placing them at substantial risk by not receiving the clinical benefits of the prescribed procedures.”

Similar advice against estimating radiation risks the way the authors did has been offered by the Health Physics Society, the International Commission on Radiological Protection, the International Organization for Medical Physics, the Society for Pediatric Radiology, and the United Nations Scientific Committee on the Effects of Atomic Radiation. The authors’ claims are simply irresponsible, and will harm children and adults by scaring them away from necessary exams.

So what are parents and patients to do? First and foremost, you should discuss any concerns you have with your family’s doctor. These are the professionals who have spent years learning medicine, and who you trust with your health and the health of your children. They have the most knowledge about your family’s health history. Doing some research on your own is also a good idea, but don’t believe every exaggerated claim you read in the newspapers or on the internet. Make sure to use reliable sources such as the Alliance for Radiation Safety in Pediatric Imaging’s website (<http://pedrad.org/associations/5364/ig/WhatcanIdoasa/Parent.aspx>) and the Health Physics Society’s website (<http://radiationanswers.org>).

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Note: All signers of this letter are members of SARI (Scientists for Accurate Radiation Information, <http://radiationeffects.org/>). The above letter represents the professional opinions of the signers, and does not necessarily represent the views of their affiliated institutions.