SPR Response to *Lancet* article re Radiation Exposure from CT Scans in Childhood and Subsequent Risk of Leukemia and Brain Tumors – June 6, 2012

The Society for Pediatric Radiology (pedrad.org) is the world’s largest organization of pediatric radiologists, and the oldest subspecialty in Radiology, consisting of physicians specializing in the imaging care (including x-rays, ultrasound, magnetic resonance imaging, and CT scans) of children.

The mission of the Society embraces the highest quality of care as well as the safety and welfare of children undergoing these imaging examinations, including CT. In a recently released article in *Lancet* entitled “Radiation Exposure from CT Scans in Childhood and Subsequent Risk of Leukemia and Brain Tumors: A Retrospective Cohort Study”, investigators reported that children under the age of 22 years undergoing several CT scans (delivering doses of 50-60 mGy) might triple the risk of leukemia or brain tumors. This translates roughly to one excess case of leukemia and one excess brain tumor per 10,000 children undergoing a CT examination in the first decade of life.

While this investigation adds to growing literature about potential risks of medical radiation, there are aspects of this study which could be debated. The Society for Pediatric Radiology has been invested in and promotes the following:

1. The CT scan is immensely valuable and has been recognized as one of the most significant innovations of modern medicine (1). CT examinations can be lifesaving, and provide many benefits for the diagnosis and management of childhood disorders (2).
2. The benefits of a CT examination, when indicated and performed appropriately, far outweigh the risks or potential risks. For example, brain CT is commonly performed in the setting of head injury and multiple studies using clinical decision rules have concluded that the benefit for detection of brain injury occurs in at least 2% of children. This is more than 200 times greater than the proposed increased risk of a brain tumor cited in the *Lancet* article (3).
3. The Society has actively worked with and encouraged manufacturers of CT scanners to design and implement technical advances that decrease radiation dose to children. Such changes have resulted in CT scanners that today use a fraction of the radiation dose of early CT scanners.
4. There have been significant improvements in how CT scanning is performed in children (such as eliminating multiple phase scans, limiting the area scanned, and using appropriate child-size machine settings) that also have lowered doses.
5. Education and advocacy, especially through the *Image Gently* (Alliance for Radiation Safety in Pediatric Imaging) and *Image Wisely* Campaign resources provide guidance regarding radiation, potential risks, and radiation management for children and their families and other caregivers, the public, healthcare providers and imaging experts.
6. Whenever possible, appropriate imaging modalities which do not use ionizing radiation, such as MR and ultrasound, should be considered. Such guidelines are exemplified in the recent Choose Wisely Campaign, a partnership of many medical professions, including Radiology. One example of the
recommendations pertaining to children is the emphasis on sonography rather than CT as the initial imaging consideration in assessing for possible appendicitis.

The Society for Pediatric Radiology recommends that patients, parents and caregivers advocate for their children, following the recommendations of many organizations, including the Image Gently Alliance:

- Ask if CT is the right study to do, or would another examination that does not use radiation be acceptable.
- Assure that the CT examination is going to be performed by an appropriately certified/accredited technologist and facility.
- Inquire if size or age appropriated CT techniques will be used.

For more information about pediatric CT, read or visit:

- NCI’s Radiation Risks and Pediatric Computed Tomography (CT): A Guide for Health Care Providers
- The Image Gently Website offers resources for parents and health care providers
- The Alliance for Radiation Safety in Pediatric Imaging’s letter to parents
- CT FAQ
- Statement from the American College of Radiology

1. Fuchs VR, Sox HC. Physicians’ views of the relative importance of thirty medical innovations. Health Affairs 200; 20, no.5:30-42