

Appendix 1: Frequently Asked Questions

Is the use of ionizing radiation in medical imaging safe?
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Radiography, fluoroscopy, CT and radionuclide medical imaging exams and procedures use low doses of ionizing radiation. While high doses of radiation have been shown to increase cancer risk, the risk from low dose levels used in medical imaging is too small to be convincingly demonstrated epidemiologically, or does not exist.

What is being done to ensure that medical imaging uses the right doses of radiation?

Nationally and internationally, the medical imaging community has mobilized extensive resources toward ensuring that medical imaging is performed using the lowest doses of radiation possible, consistent with answering the diagnostic question or performing the required procedure. Campaigns such as Image Gently® and Image Wisely® provide educational materials to imaging providers, referring physicians, patients and family members. Additionally, medical payers require accreditation of medical imaging practices that includes assessment of provider credentials, quality assurance programs, image quality, and radiation management techniques.
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What are typical radiation doses from medical imaging? What levels are considered safe?
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Effective dose levels from modern medical imaging range from fractions of a milliSievert to 10-20 milliSievert. Below 100 milliSieverts, the long term risk of ionizing radiation is
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too small to be convincingly demonstrated epidemiologically, or does not exist.

What measures can I and my patients take to ensure that we are receiving safe levels of medical radiation?

Providers should ensure that their patients understand the reason that the exam or procedure is being recommended and that the information gained from the exam will inform patient management in a meaningful way. Once it has been agreed that an exam or procedure is appropriate, an accredited imaging provider should be used to perform the exam or procedure. The American College of Radiology, for example, assesses personnel qualifications, quality assurance practices, image quality and dose as part of their accreditation program.

Should CT exams be avoided in children?

The diagnostic accuracy of a required exam is paramount, thus a CT exam should be performed when it is the most appropriate imaging exam. When equivalent accuracy can be obtained with modalities that do not use ionizing radiation, such as ultrasound or MRI, those exams are appropriate alternatives. Cost, availability, local expertise, and the need for anesthesia are also important factors to consider when selecting the most appropriate imaging exam or procedure.

How does the dose level from a CT scan compare to other sources of radiation that people are exposed to?

Every day, people are exposed to ionizing radiation from many naturally occurring sources such as radon gas in the home, radiation from outer space, radiation in rocks

and soil, and naturally occurring radioactive elements in the body. The dose from a CT scan can range from below 1 milliSievert to 10-15 milliSievert. The annual dose from naturally occurring sources of radiation is, on average, about 3 milliSievert, but can range from 1 – 20 milliSieverts, the higher levels being experienced by those who live at higher elevations and over certain types of soil.

After a CT study, does any radiation remain in the body?

No. Unlike a radionuclide study, the second the CT scanner stops imaging, there is no more radiation present. (For most diagnostic radionuclide studies, the vast majority of the radioactivity is eliminated from the body by decay and excretion over a period of hours to days.)

Can a pregnant patient receive a CT exam?

Yes, a CT may be ordered in pregnant patients if the mother's medical condition requires imaging to make an accurate diagnosis or guide treatment. The radiation exposure to the fetus from a single CT examination of the abdomen and pelvis is considered to impart negligible risk.¹

Is there a limit to the number of CT exams that a person can have?

No, there is no limit placed on the number of CT images a person can have. However, insofar as each exam theoretically may carry some small risk, each scan should be justified by the current medical situation.

What additional resources are available for me and my patients?

The Health Physics Society offers a number of excellent educational resources on radiation and radiation safety:

<http://hps.org/hpspublications/radiationfactsheets.html>

<http://hps.org/physicians/documents/#>

http://hps.org/physicians/radiology_pregnant_patient_qa.html

<http://www.radiationanswers.org>

The Image Wisely® <http://www.imagewisely.org> and Image Gently®

<http://www.imagegently.org> campaigns offer a range of resources for providers, referring physicians and patients.

The Radiological Society of North American and American College of Radiology offer a patient education website, RadiologyInfo.org <http://www.radiologyinfo.org>.

More in-depth information and recommendations can be found in selected publications of the National Council on Radiation Protection and Measurements

<http://www.ncrponline.org> and from the American Association of Physicists in Medicine

<http://www.aapm.org>.

¹National Council on Radiation Protection & Measurements

(NCRP). NCRP Report No. 174: Preconception and Prenatal Radiation

Exposure: Health Effects and Protective Guidance. Bethesda, MD: National Council on Radiation Protection & Measurements; 2013.