

Radiation Exposure in Medical Imaging

This handout answers questions about radiation exposure and what Seattle Children's Hospital is doing to keep your child safe.

Medical imaging uses machines and techniques to provide valuable information about your child's health. It plays an important role in helping your doctor make the correct diagnosis. Some of these machines use radiation to get these images.

We are all exposed to small amounts of radiation in normal daily life from soil, rocks, air, water and even some of the foods we eat. This is called background radiation. The amount of background radiation that you are exposed to depends on where you live and varies throughout the country. The average person in the United States receives about 3 milli-Sieverts (mSv) per year from background radiation. A mSv is a unit of measurement for radiation, like an inch is a unit of length.

Which medical imaging exams use radiation?

MRI and ultrasound do not use ionizing (high-energy) radiation to make images. MRI uses magnets and radio waves, and ultrasound uses sound waves.

Diagnostic Radiography

An X-ray is a form of energy that can pass through your child's bones and tissues to create an image. The image created is called a radiograph, sometimes referred to as an "X-ray." X-rays are used to detect and diagnose conditions in the body.

CT scan

A CT (computed tomography) scan, sometimes called a "CAT scan," uses X-rays, special equipment, and computers to make pictures that provide a multidimensional view of a body part.

Nuclear medicine studies

In nuclear medicine studies, the radiation exposure does not come from a machine. It comes from small amounts of radioactive materials (isotopes) that are given to help diagnose and/or treat disease. After most exams, the isotope will leave your child's body within a day. Nuclear medicine looks at how organs, tissue or bones are working to see if there is a problem.

How much radiation will my child be exposed to?

The radiation dose varies with each patient and type of exam. Our team uses each patient's age and weight to determine the radiation dose needed to get the best medical images. The radiation doses at Seattle Children's are consistently lower than the guidelines recommended by the American College of Radiology (ACR).

To Learn More

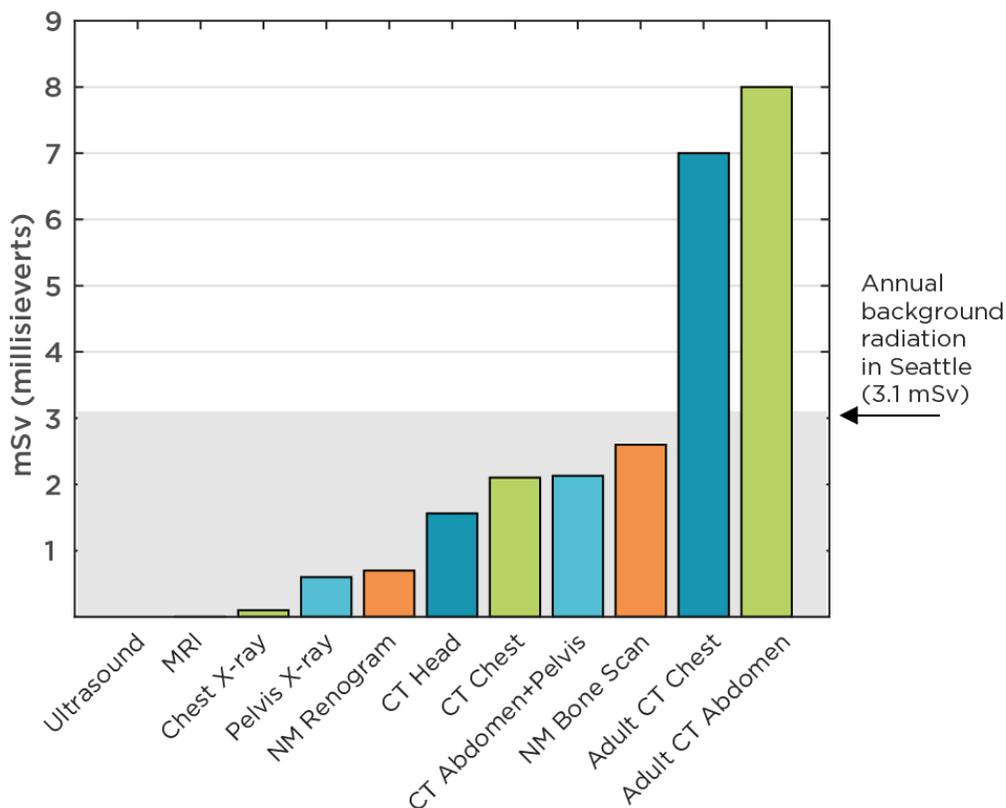
- Radiology
206-987-2089
- Ask your child's healthcare provider
- seattlechildrens.org

Free Interpreter Services

- In the hospital, ask your nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.

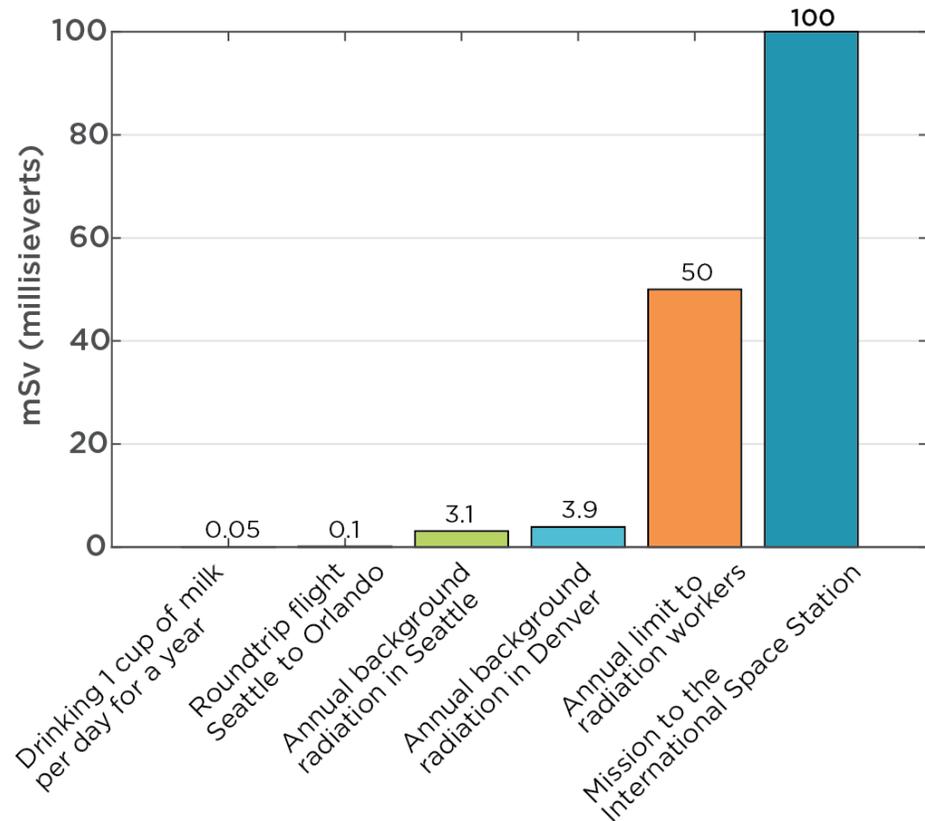
The charts below show the typical doses for common exams at Seattle Children's for a 5-year old child and examples of other radiation levels. A CT exam of the head gives about 1.5 mSv. This equals about the same amount of radiation received from living half of a year in Seattle. A chest X-ray is 0.1 mSv, which is about the same amount of radiation that you get on a round-trip flight from Seattle to Florida. An astronaut who travels to the International Space Station will get about 100 mSv of radiation on each mission.

Radiation Doses for Common Exams at Seattle Children's



The chart above shows the typical radiation doses for exams performed on a 5-year child at Seattle Children's compared to typical doses for adults.

Radiation Doses - Other Examples



Why do we pay attention to medical radiation exposure?

The amount of radiation that your child is exposed to during an X-ray, CT scan or nuclear medicine study is low. The low levels of radiation received from these tests have minimal risk compared to the natural risk of getting cancer during your lifetime. At Seattle Children's, we use the lowest amount of radiation needed to perform your child's exam. For more information about medical radiation safety visit the Image Gently website listed below under Resources.

Your child's healthcare provider always takes into account the benefits and risks of an imaging study. These exams provide important information to help us diagnose, treat and monitor your child's condition. The benefits of appropriate imaging always outweigh any minimal radiation risk to your child.

What is Seattle Children's doing to reduce radiation exposure?

Our radiologists and technologists are experts at working with children. We research the latest technology and ways to reduce radiation exposure. Here are a few of the things we will do to protect your child:

- Weigh the risks and benefits and only obtain medical imaging when needed
- Use the newest technology and the lowest amount of radiation needed
- Take the least amount of images needed
- Image only areas of the body needed
- Customize imaging protocols for each child
- Use shields over reproductive organs and thyroid gland when appropriate
- Use anesthesia when appropriate
- Use a Child Life specialist to work with patients and families to help reduce anxiety and guide children through the test. This helps reduce exam time and exposure to radiation for your child.

What if I have more questions?

You are encouraged to discuss your concerns with your child's primary care provider. They can talk to you about the benefits and risk of a test, as well as talk about alternative tests. Once the test has been ordered, our imaging experts are pleased to answer your questions.

Resources

- Image Gently website: imagegently.org
- "What Can I do as a Parent?":
imagegently.org/Roles-What-can-I-do/Parent
- To learn more about radiation in our environment:
ans.org/pi/resources/dosechart/