

## What you need to know about...

# Shields and Safety

Have you ever wondered why the person taking your x-ray sometimes partially covers you with a heavy lead apron? And why that person leaves the room or steps behind a barrier before he or she takes your film? Perhaps not, but for the certified radiologic technologist who performs your diagnostic imaging examination, it's a matter of safety and quality patient care.

### Natural and Artificial Radiation

Radiation is a frightening word to many people, but humans are exposed to different forms of radiation every day. Sources of radiation include cosmic rays from the sun, radioactive elements in the earth's crust and even radioactive elements in our bodies. Natural sources contribute approximately 82% of the annual radiation dose to the U.S. public.

Medical uses of radiation, such as x-rays and nuclear medicine procedures, represent most of the exposure to artificial or man-made radiation. Each year, the average American is exposed to about 3 millisieverts (mSv) of naturally occurring "background radiation" from his or her environment. By comparison, a typical dental x-ray exposes a patient to approximately 0.06 mSv, a chest x-ray delivers 0.08 mSv and a mammogram delivers about 1.0 mSv.

### Are X-rays Safe?

X-rays are a form of "ionizing" radiation. When this type of radiation passes through living cells, ions are formed that react with other atoms in the cell, causing damage. With low doses of radiation, cells repair the damage quickly. Although we have no direct evidence that small doses of radiation are harmful, the medical community operates under the assumption that any exposure, no mat-

ter how small, carries some potential for biological damage.

Any potential risk associated with radiation exposure should be balanced against the potential benefits of the examination. For example, early detection of breast cancer far outweighs the very small risk associated with radiation exposure from a mammogram.

### Radiation Protection

Radiation protection includes those practices and devices that limit exposure to ionizing radiation. Qualified radiologic technologists are educated in radiation safety and protection and use techniques to minimize dose and exposure. That's why it's important to ensure that your medical imaging examination is performed by a radiologic technologist who is nationally certified or licensed by the state. In addition, new techniques and equipment are continually being developed to decrease the total amount of radiation received by the patient.

Certain organs are "radiosensitive," which means they are more sensitive to the effects of radiation exposure than other parts of the body. Those organs, including the thyroid gland and the male and female reproductive organs, usually are shielded when they are in the path of the x-ray beam. Shields commonly are made of lead strips or materials saturated with lead, which block the x-rays. Because a developing fetus also is radiosensitive, pregnant women should seek a physician's advice before undergoing an x-ray examination. If you must remain in the room with a child or other family member during an exam, ask about shielding for yourself.

Radiation protection extends to medical imaging professionals as well. Although the radiation dose for each examination is relatively small, the total dose to medical professionals can add



Illustration by Laura Reed, ASRT graphic designer.

A young radiology patient with reproductive organs protected by a lead shield.

up over time. Many state and federal regulations strictly limit the total dose that people working with radiation can receive. Before the radiologic technologist makes an exposure, he or she will move to a shielded control booth or behind a protective barrier. Lead aprons protect technologists who must remain in the examination room with the patient.

If you have questions or concerns about radiation safety, ask a certified radiologic technologist.

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