

Medical radiation use for children, adults examined

By Kim Kyle Morgan

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Dr. Terri Alani left, demonstrates the use of a thyroid collar for a digital X-ray on patient Millicent Holliday right, on Wednesday. Photo: James Nielsen / © Houston Chronicle 2012

There's been a lot of buzz about the health risks of radiation, from an increase in brain tumors and thyroid cancer via the dentist's chair to the long-term effects in children who undergo CT scans.

But there are a couple of things patients and parents can do to minimize the risk.

[Dianna Cody](#), director of clinical operations of imaging physics at [M.D. Anderson Cancer Center](#), said radiation is used as both a diagnostic tool and a treatment tool for diseases including cancer.

But can it cause cancer? Does the risk of cancer increase with each CT scan?

"We're still figuring a lot of this stuff out," Cody said. "There is a multi-hit model for most types of cancer as they form from the beginning. The first hit might be an X-ray, a CT scan, or even something you ate. There is some sort of initiating event. After that, though, several other things have to happen for cancer to grow."

Ask exam questions

One thing is certain, Cody said. Children are more susceptible to the effects of radiation.

"They have a triple whammy," Cody said. "First, they have a longer lifespan in front of them (than adults) in which to develop cancer. They also tend to have more dividing cells - cells in a certain stage of division that makes them more vulnerable to the effects of X-ray. And, they're just smaller. Kids don't carry the self-shielding stuff that we call fat, the built-in protection most adults have."

That being said, the benefits of CT scans often outweigh the risks, Cody said. Parents, however, should ask the physician some questions.

"First, what is it we're trying to find out here?" Cody said. "It should be very clear to everybody involved about what it is we're trying to find out. And, is there another way to get that information that does not require X-ray?"

If a CT scan is necessary, Cody advises parents to ask if machinery settings are pediatric-friendly.

Cody said CT-scan vendors are under pressure to provide equipment with features that allow radiologists to "dial down" the amount of radiation pediatric patients are given.

GE Healthcare recently announced a new initiative called "GE Blueprint for low dose," which GE Chairman and CEO [Jeffrey Immelt](#) said could reduce radiation exposure by 50 percent in the next three years.

"We can do our part," Immelt said, "but we can't get it to the patients unless there's tremendous collaboration between healthcare providers and technology companies like GE."

Low-dose technology

GE Blueprint aims to help healthcare providers integrate a variety of low-dose CT technologies. GE's low-dose technologies include DoseWatch, a program that measures and monitors patient radiation dose; and Veo, a CT image reconstruction software program that significantly reduces the amount of radiation required without compromising high-definition imaging.

GE Healthcare recently released its second-generation version of Veo. GE spokesman [Benjamin Fox](#) said the new technology is not yet in use in Houston.

"We've been used to thinking of CT scans as 'well, one CT chest scan equals 50 X-rays,' but now we're seeing cases where one CT chest scan is at the same level as a chest X-ray," said [Ken Denison](#), GE Healthcare's CT Dose Leader. "A goal of CT scanning is exposure of less than one millisievert."

A millisievert is the dose of radiation people are exposed to.

To put the numbers in perspective, Denison said, the average American is exposed to three millesieverts per year just from living where we live or eating what we eat.

Speaking of what we put in our mouths, dental X-rays have also become food for thought.

A report published by the American Cancer Society reported a link between a benign brain tumor called a meningioma and dental X-rays.

[Terri Alani](#), a Houston dentist with more than 30-years at her practice on Westheimer, said the study created some "hysteria," perhaps unnecessarily. The study, she said, was based on people's memories of how often and when they were X-rayed - not a great method, considering a lot of people naturally experience memory fading over the years.

Digital dental X-rays

Even so, patients are wise to ask about safety precautions, she said. A great first step is asking for digital dental X-rays.

Alani, who is the media chair for the [Greater Houston Dental Society](#), a local component of the Texas and American Dental Associations, estimates that about 30-35 percent of dentists have gone to digital X-rays, a move that reduces radiation exposure up to 80 percent.

Patients must be covered with a lead apron, but should also ask for a thyroid collar, Alani said.

[Kim Kyle Morgan](#) is a freelance writer living in Tomball.

More Information

X-ray sources

Ask the dentist:

1 Do you use digital X-rays?

1 Do you have a thyroid collar?

1 Do I really need X-rays every six months?

Ask the doctor:

1 What do you want to achieve with a CT scan?

1 Do you adjust settings to meet pediatric protocol?

1 Is there another test that is as efficient/quick/accurate?

Fast facts:

1 X-rays and CT scans both use electromagnetic energy to produce images.

1 CT scans take five to 20 minutes to complete.

1 X-rays were invented in 1895.

1 CT scans were invented in the early 1970's.

1 X-rays are used in CT scans.

1 X-rays are a 2-dimensional view.

1 CT scans offer many views.

Millisieverts:

1 6.20 mSv - average dose per person per year, including 2.28 just from the air

1 X-ray exposure ranges from .005 mSv (dental bitewings) to 8 mSv (barium enema)

1 CT scan exposure ranges from .10 (extremity scan) to 20 mSv (cardiac)

1 A chest X-ray has .10 mSv, a chest CT scan can be as high as 7 mSv

*source: American Nuclear Society,