

Benefits & risks of medical imaging radiation

PATIENT INFORMATION SHEET G03



Benson Radiology is an accredited medical imaging provider.

We abide by the South Australian Radiation Protection and Control Act and the guidelines of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

What is medical imaging radiation?

Medical imaging radiation refers to ionising radiation from x-rays and gamma rays.

Radiation is naturally occurring and can be found in radioactive substances in our food, water, the air we breathe, in the ground or in building materials.

Medical imaging x-rays are electrically generated and are only present when the equipment is activated. Having an examination that uses ionising radiation does not make patients radioactive.

Gamma radiation is emitted from the pharmaceutical administered in a nuclear medicine scan. Nuclear medicine patients will be radioactive for a short time.

What is radiation dose?

When the path of an x-ray is altered by contact with an object, the x-ray deposits some of its energy to that object (including the human body). This deposit of energy is called a radiation 'dose'.

What examinations are associated with radiation?

Examinations that use radiation include:

- > x-ray
- > CT
- > fluoroscopy
- > mammography
- > bone mineral densitometry (BMD)
- > nuclear medicine studies such as PET/SPECT/SPECT CT

Ultrasound and magnetic resonance imaging (MRI) examinations do not use radiation.

Benefits vs risks

The purpose of medical imaging is to provide images of sufficient quality to assist the diagnosis and treatment of medical conditions. In this regard, x-ray imaging generally offers the advantage of being low risk, non-invasive, fast and accurate.

Risks from medical imaging radiation are difficult to accurately measure and are subject to considerable debate. It is believed the risk of developing cancer is slightly increased if you have been exposed to additional ionising radiation above background levels.

However the increased risk is small, and usually less than the risk of not identifying or treating the medical condition. A very low dose x-ray, such as a chest x-ray, has a very small risk. And while CT scans may have higher radiation dose, the risk would still be classified as small.

Deciding to have an imaging procedure involving radiation

Your doctor, in consultation with you, will make an assessment that the benefits of the imaging test outweigh any possible risks of radiation.

Our radiologist or nuclear medicine specialist will also assess the appropriateness of the test. This is done by taking into account the information on your imaging request form together with your medical history.

You should discuss with your referring doctor the benefits of having the study.



Children and radiation

The risks are not the same for all people.

The long term risks of medical radiation are lower for elderly patients in comparison to children or unborn children. Children are more sensitive, as the cells that make up their growing tissues and organs are dividing more rapidly.

Extra care is taken with young or pregnant patients and it is important to limit radiation levels or consider alternative tests.

Putting medical imaging procedures into perspective

The table below compares medical radiation with background radiation and the radiation received from flying in a plane.

It also shows the small increased risk of cancer by having a medical radiation procedure.

Medical imaging procedure	Equivalent background radiation	Flying time resulting in equivalent radiation	Increased risk of death from cancer (due to radiation from procedure)
Chest x-ray	3 days	7 hours	1 in 1.3 million
Abdomen x-ray	3 months	230 hours	1 in 36,000
Mammogram	2 months	130 hours	1 in 63,000
CT head	10 months	670 hours	1 in 13,000
CT chest	3.3 years	2,700 hours	1 in 3,100
Bone scan	1.7 years	1,300 hours	1 in 6,300
Barium enema	3 years	2,300 hours	1 in 3,600

Please note: in Australia there is a risk that about 3 in 10 people will die of cancer, even if they have never had medical radiation

References

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