



Information for Consumers - Radiation Risks of X-Rays and Scans

This article tells you about the radiation risks of having x-rays scans which use ionising radiation.

What is radiation?

Some Imaging procedures use x-rays which are a special type of radiation called 'ionising radiation'. Ionising radiation is also found all around you in the soil, sun, air, plants, food, drink and buildings you live in. This is called background radiation.

Radiation dose

The amount of radiation you receive is measured in Sieverts (Sv). We all receive about 2 thousandths of a Sievert (2 mSv) from background radiation every year, which comes from space and from the rocks of the earth. This is a very small amount (in the 'low dose range').

X-rays, CT scans, nuclear medicine scans and PET scans

Ionising radiation is used in x-rays, CT (Computed Tomography) scans and nuclear medicine scans including PET (Positron Emission Tomography).

X-rays are used to take pictures of bones and some parts of inside your body, including the lungs.

CT scans, which use x-rays, take more detailed pictures (cross-sections) of inside your body, such as the lungs, bones, blood vessels and other organs of the body.

Nuclear medicine and PET scans use a small amount of radioactive material. This is either injected into you, or you breathe it in or swallow it. A special camera is then used which detects the energy from the radioactive material in your body.

Ultrasound and MRI scans involve no ionising radiation.

Benefits

X-rays:

- Painless, fast and easy

CT scans:

- Used for diagnosis to show detail of parts inside your body, such as the lungs, brain, abdominal organs, bones and blood vessels.
- Can be used to look at parts inside your body instead of using surgery.
- Painless, accurate and fast

Nuclear Medicine scans:

- Used for diagnosis and to look at how the heart, brain, kidneys and other organs are working



PET scans:

- Detects changes including cancer in your body at a very early stage Can detect changes at an earlier stage than CT or MRI

Risks

Ionising radiation may cause damage to the cells in your body. This is usually very minor and does not cause any serious damage, however, large doses may cause the cells to become cancerous. A very low dose x-ray, such as a chest x-ray, has a tiny risk. CT scans, which use higher doses of x-rays, have a higher risk, although it is still a very small risk.

Your doctor is aware of the risks and benefits of x-rays, CT scans and nuclear medicine scans and should always balance the possible benefits of you having the test with the small risk. It is always appropriate for you to have the x-ray or scan if it benefits you. Finding out if you have something wrong with you and the best way to treat it outweighs the very small risk of the scan.

The amount of radioactive material used for nuclear medicine scans and PET scans is very small, however, the radiation can sometimes take as long as a few days to pass out of your body. The amount of radiation you receive from these scans is similar to what you receive from x-ray procedures.

Imaging procedures involving ionising radiation are not usually recommended for pregnant women, but can be performed in an emergency.

If you are having an x-ray dye for your CT scan or a radioactive tracer for your nuclear medicine scan, there is a small risk of:

- An allergic reaction.
- Infection at the site of an injection

If you are concerned about the risks, talk to your doctor before the examination.

Consent

You have the right to refuse an examination and may do so if you wish. A written consent is not required for plain x-rays, however, may be required for some types of scans.

Further information

For more detailed information please access Radiation Risk of Medical Imaging from InsideRadiology at: www.insideradiology.com.au

This is a resource produced especially for consumers by the Royal Australian and New Zealand College of Radiologists: www.ranzcr.edu.au

A guide to gathering information that you may need for making informed decisions is published by the Consumers' Health Council of Australia at: <https://chf.org.au>

If you would like to look at other relevant articles, please access the following



- [Ionising Radiation](#)
- [Plain x-ray](#)
- [CT scan](#)
- [Bone scan](#)
- [Renal scan](#)
- [PET scan](#)

Or access the Diagnostic Imaging Pathways website at:
www.imagingpathways.health.wa.gov.au/index.php/consumer-info

Or if you have questions or require any other information please contact your Doctor.

Consumer participation

This information has been reviewed by representatives from the following groups:

- Aboriginal people
- People with disabilities
- Seniors
- CALD (Culturally and Linguistically Diverse)
- The Health Consumers' Council

Feedback

All feedback, comments and suggestions regarding consumer information at Diagnostic Imaging Pathways are welcome. Please direct them to the following email address: dipfeedback@health.wa.gov.au

Disclaimer

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