

Patient information

Medical Radiation information For Patients and Relatives.

Radiology Department

In today's Radiology department different types of medical imaging are available, some of which use radiation for X-Rays. Patients and relatives are sometimes concerned about the possible harmful effects of radiation. This leaflet goes on to explain the risks of X-rays and put them into perspective.

1. What is Radiation?

Radiation is a form of energy which travels through space in the form of waves or particles in a similar way to visible light. Higher energy radiation e.g. the type used in medicine is called 'ionising' radiation.

Small amounts of ionising radiation from natural sources are all around us from the ground and building materials, the air we breathe, the food we eat and even from outer space. In the UK the largest source of background radiation exposure is from radon gas which seeps out of the ground. 84% of the dose to the UK population comes from natural sources.

The vast majority of man-made radiation comes from medical X-rays, but not all types of imaging we use in the Radiology department use ionising radiation. For those that do, any radiation risks are carefully weighed against potential benefits from the medical information obtained, by experienced radiology staff, prior to every examination which is performed.

Imaging methods which do use ionising radiation include:

X-rays

This is the familiar X-ray many of us have at some time during our lives, often looking for broken bones or at the chest or teeth, using a beam of radiation which is projected through the human body onto a detector. All X-ray images are now digital so you won't see the staff holding films up to light boxes anymore. This type of X-ray involves a very small amount of radiation.

Fluoroscopy

This is sometimes called 'screening' and involves using X-rays as live images in a video format. This is often used for more complex and time consuming procedures and so the radiation dose is usually higher.

Computed Tomography (CT) Scanning

This method uses a large circular machine where a fan shaped beam of X-rays rotates around the body and produces 'slices' or 3D images which contain a lot of detail about the anatomy of the body. As the beam of X-rays is continuous during the scan, the dose from this type of examination is again higher than a standard X-ray.

Nuclear Medicine/Isotope Imaging

Instead of using an X-ray machine, a small amount of radiation (isotope) is injected into a vein. The radiation then concentrates in a particular organ or tissue and is detected by a 'gamma camera' or nuclear medicine scanner which is able to build up an image of the area. After the scan the radiation in the body falls to undetectable levels in a very short time.

Other Imaging Procedures

Imaging methods which don't use ionising radiation are ultrasound scanning (using sound waves) and magnetic resonance imaging (MRI) which uses a magnetic field to produce images. Although both these methods can produce detailed pictures there are some areas of the body they are not suitable for imaging, and therefore they cannot replace all types of X-ray examinations.

Risks of Radiation?

The amount of ionising radiation used in diagnostic medical examinations is far too small to produce any immediate harmful effects. The only detrimental effect of diagnostic irradiation is a slightly increased risk of cancer occurring often years or decades later. This must be considered in context; unfortunately we all have a one in three risk of developing cancer during our life.

Occasionally we may use Fluoroscopy to guide us when performing certain Interventional procedures, such as inserting stents inside damaged or narrowed blood vessels. These can sometimes be very complex procedures that may require a long 'screening' time. During these more complex procedures there is a very small risk that the skin over the area being operated on could become reddened and irritated, much like sunburn. However, this is quite rare and the staff would know at the end of the procedure if the 'skin dose' was high enough to carry a risk of causing damage.

The clinical team looking after you would be informed of this and they would follow this up with you when you come back to see them at your next appointment. The Doctor undertaking the procedure shall discuss this with you when they take your consent for the procedure.

Radiation Risks in Perspective

Radiation involved in medical examinations can be put into perspective by comparing it with the natural background radiation we are all exposed to:

X-ray Examination	Equivalent Background Radiation	Lifetime Additional Risk of Cancer*
Chest, teeth Arms and legs Hands and feet	A few days	Less than 1 in 1,000,000
Skull Neck	A few weeks	1 in 1,000,000 to 1 in 100,000
Hip /Spine Abdomen CT head scan Isotope scan	A few months to a year	1 in 100,000 to 1 in 10,000
CT scan of chest or abdomen	A few years	1 in 10,000 to 1 in 1,000

***These risk levels represent very small additions to the one in three chance we all have of getting cancer.**

How do we manage the risks of radiation?

The risks associated with medical imaging are much less than the potential risks associated with the medical condition under investigation. All imaging is performed using the minimum amount of radiation necessary to produce a diagnostic image, and is individualised for each patient depending on the size of the patient and the condition being investigated.

Any examination using ionising radiation is only performed when strictly necessary and it is felt the benefits of the examination outweigh any potential risks. There is no limit on the number of examinations a single patient might have, but the need for each examination is judged on its own merits. Make sure your doctor is aware of any X-rays or scans you have had previously, in case they make additional examinations unnecessary. Please do not ask for X-rays or scans if they are not needed.

Radiation for Babies and Children

Babies and children are more at risk from the effects of ionising radiation. This is why particular attention is paid to ensuring there is a clear medical benefit to every child who is X-rayed and the radiation dose is kept as low as possible.

The unborn baby is more sensitive to radiation than an adult, which is why we ask individuals of reproductive age if there is any possibility they may be pregnant before performing certain examinations of or close to, the abdomen and pelvis.

Whatever type of examination you are having if you think there is any possibility you might be pregnant please tell the Radiographer (the person performing your X-ray or scan).

If you arrive with a baby or small child for an X-ray we may ask you to stay in the room to support them during the examination. If you are or might be pregnant you won't be able to do this, so please ensure you bring someone else with you.

To protect children from any unnecessary exposure to radiation we would ask if you have an appointment with us and have to bring children with you, that you bring someone else also so that they may wait outside with your child whilst you have your examination.

Radiology Staff

Radiographers are the health care professionals who carry out the majority of X-rays and scans. As Radiographers work with radiation every day they have to take additional measures to ensure they work safely. When X-rays or scans are taking place they will stand behind the lead screen in the X-ray room (X-rays are unable to pass through lead) or in the separate control room. Where there is no fixed screen you may see them wearing 'lead' aprons. Radiographers also wear badges to monitor how much radiation they are receiving, although the risk to staff is very low.

Feedback

Your feedback is important to us and helps us influence care in the future.

Following your discharge from hospital or attendance at your outpatient appointment you will receive a text asking if you would recommend our service to others. Please take the time to text back, you will not be charged for the text and can opt out at any point. Your co-operation is greatly appreciated.

Further Information

If you have any specific queries about the examination you have been sent an appointment for, to ensure your query is handled by the appropriate team please contact the number provided on the appointment letter.

For more information about Radiation risks please see:
<https://www.phe-protectionservices.org.uk/radiationandyou/>

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