

RADIATION... IN A NUTSHELL

An x-ray is a quick and painless procedure commonly used to produce **images** of the inside of the body.

It is a very effective way of looking at the bones and can be used to help detect a range of conditions

X-rays are usually carried out in x-ray departments by trained specialists called **Radiographers**.

HOW X-RAYS WORK

X-rays are absorbed at different rates by different parts of the body. The patient is positioned in front of a detector which absorbs the energy and transforms this into an image.

Dense parts of your body that x-rays find more difficult to pass through, such as **bone**, show up as **clear white** areas on the image. Softer parts that can pass through more easily, such as your **lungs**, show up as **darker areas**.

WHEN IS AN X-RAY NEEDED.

They are mainly used to look at **bones** and **joints**, although they are sometimes used to detect problems affecting soft tissue, such as internal organs.

Problems that may be detected during an x-ray include:

- Bone **fractures**
- **Scoliosis** (abnormal curvature of the spine)
- **Tumours**
- **Lung Diseases**, such as pneumonia, lung cancer and TB
- **Dysphagia** (swallowing problems)
- Heart problems, such as **heart failure**
- **Breast cancer**

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HOW SAFE ARE X-RAYS?

People are concerned about being exposed to radiation during an X-ray. However, the part of your body being examined will only be exposed to a low level of radiation for a fraction of a second.

Generally, the amount of radiation you are exposed to during an x-ray is the equivalent to between a few days and a few years of exposure to natural radiation from the environment.

Being exposed to x-rays does carry a risk of causing cancer many years or decades later, but the risk is thought to be very small.

All risks and benefits of having an X-ray will be considered before proceeding with the procedure. Discuss this with your doctor or specialist should you be unsure.

Diagnostic procedure	Typical effective doses (mSv)	Equivalent period of natural background radiation	Lifetime additional risk of fatal cancer per examination
Limbs and joints (except hip)	<0.01	<1.5 days	1 in a few million
Teeth (single bitewing)	<0.01	<1.5 days	1 in a few million
Teeth (panoramic)	0.01	1.5 days	1 in 2 million
Chest (single PA film)	0.02	3 days	1 in a million
Skull	0.07	11 days	1 in 300 000
Cervical Spine (Neck)	0.08	2 weeks	1 in 200 000
Hip	0.3	7 weeks	1 in 67 000
Thoracic Spine	0.7	4 months	1 in 30 000
Pelvis	0.7	4 months	1 in 30 000
Abdomen	0.7	4 months	1 in 30 000
Lumbar Spine	1.3	7 months	1 in 15 000
Barium Swallow	1.3	8 months	1 in 13 000
IVU (kidneys and bladder)	2.5	14 months	1 in 8000
Barium meal	3	16 months	1 in 6700
Barium follow	3	16 months	1 in 6700
Barium enema	7	3.2 years	2 in 3000
CT head	2	1 year	1 in 10 000
CT Chest	8	3.6 years	1 in 2500
CT Abdomen/ pelvis	10	4.5 years	1 in 2000

UK average = 2.2mSv per year: regional averages range from 1.5 - 7.5 mSv per year.

Approximate lifetime risk for patients 16 to 69 years old: for paediatric patients multiply risks by about 2 for geriatric patients divide risks by about 5

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