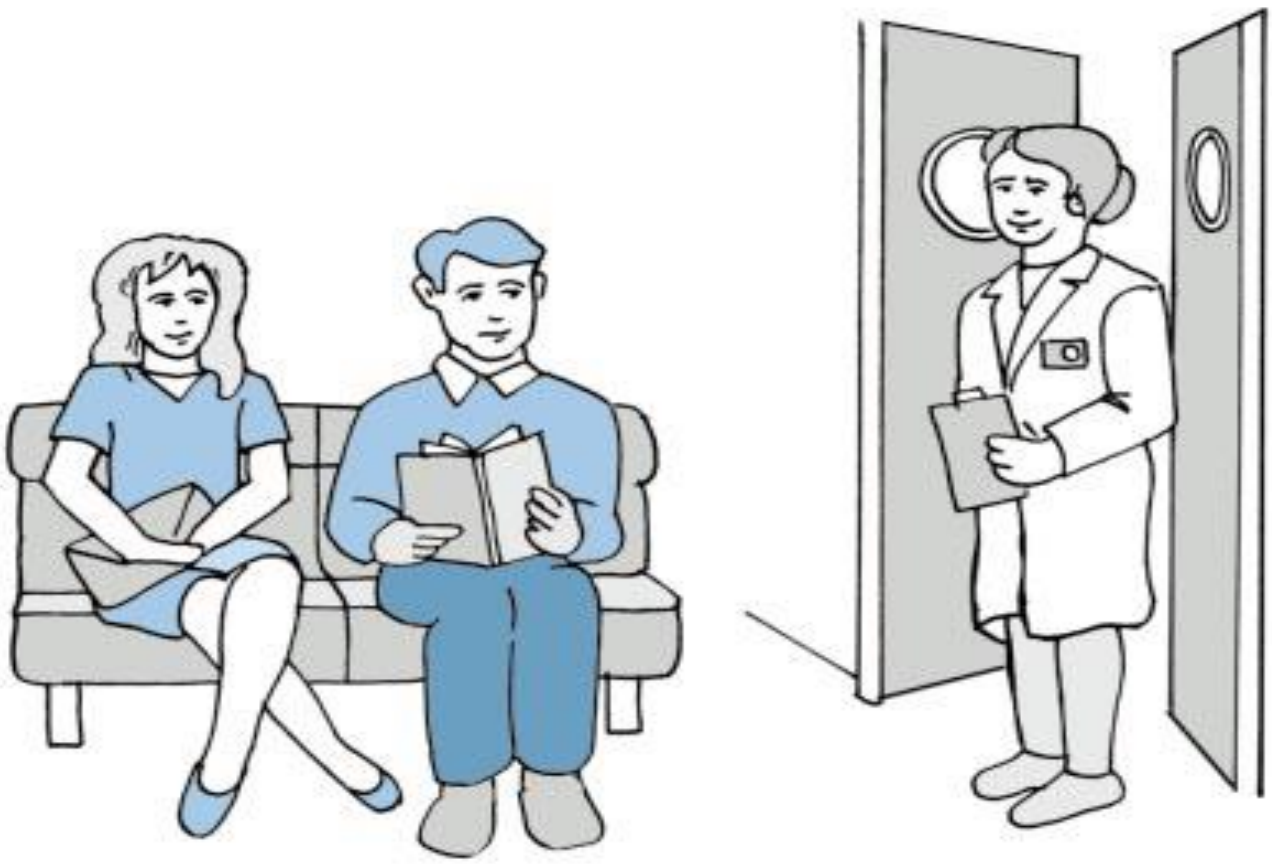
X-rays

How safe are they?



An X-ray is a painless and quick procedure that is used to produce images of the organs present inside your body-especially your bones.

Imaging methods which use X-rays

Radiography

This is the familiar X-ray which most of us will have had at some time during our lives, usually for looking at broken bones or at the chest or teeth. A machine directs a beam of X-rays through the part of your body that is being examined and a detector picks up an image and displays it on a computer.

Fluoroscopy

This is sometimes called 'screening'. After passing through your body, the X-ray beam is viewed by a special camera which produces a moving picture on a TV screen. The radiologist performing the examination can take snapshots of any important findings, or record the whole thing on video. Fluoroscopy is often used to look at the gut. For example, in a 'barium meal' you will be asked to swallow a drink of barium, which is shown up well by X-rays, to give moving pictures of your stomach and intestine. Fluoroscopic examinations usually involve higher radiation doses than simple radiography.

Computed tomography (CT) scan

This is a more sophisticated way of using X-rays. You lie on a narrow table which passes through a circular hole in the middle of the machine. A fan-shaped beam of X-rays passes through a slice of your body on to a bank of detectors. The X-ray source and the detectors rotate around inside the machine. An image of the slice is formed by a computer and displayed on a TV screen. You are moved slowly through the hole to take pictures of different slices of your body and sometimes to produce 3D pictures.
If many slices are imaged, the radiation dose can be as high as or higher than that for fluoroscopy.

Ultrasound

These do not use X-rays or gamma rays and, so far, no ill-effects have been seen from ultrasound examinations. So why not use them for all pictures, and then there will be no concern about possible radiation risks? The answer is that, although they can give beautifully detailed pictures of some parts of the body, they are unable to provide useful pictures to replace all types of X-ray examination.

Benefits and Risks

The quantity of radiation that you get exposed to while undergoing an X-ray is equivalent to getting exposed to natural environmental radiation, which comes from the ground and building materials around us, the air we breathe, the food we eat and from outer space. The level of dose varies with the type of examination, ranging from the equivalent of a few days of natural background radiation to a few years. All the methods of medical imaging can bring very real benefits to patients from making the right diagnosis, and consequently giving you the right treatment, outweigh any small risk involved.

To explain it in simple terms we can compare the radiation exposure from one chest x-ray as equivalent to the amount of radiation exposure one experiences from our natural surroundings in 10 days.

For this Procedure:	**Your effective estimated radiation dose is:**	**Comparable to natural background radiation for:**
Abdominal Region:		
CT Chest Abdomen Pelvis	10 mSv	3 years
Radiography of Upper GI Tract	6 mSv	2 years
Chest		
Routine Chest	0.1 mSv	10 days
Bone:		
Radiography–Spine	1.5 mSv	6 months
Bone Densitometry	0.0001 mSv	Less than 1 day
Central Nervous System:		

CT Head	2 mSv	8 months
CT Spine	6 mSv	2 years
Woman's Imaging		
Mammogram	0.7 mSv	3 months

Radiation risks in perspective

The risk associated with medical imaging procedures refers to possible long-term or short-term side effects. Most imaging procedures have a relatively low risk. We practice ALARA (As Low As Reasonably Achievable) this means we make every effort to decrease radiation risk.

Children: Since children are developing and growing, the cells of their body are dividing rapidly. These rapidly dividing cells are very prone to DNA damage due to radiation exposure. This is why particular attention is paid to ensuring that there is a clear medical benefit for every child who is X-rayed. The radiation dose is also kept as low as possible without detracting from the information the examination can provide.

Pregnant females: A baby in the womb may also be more sensitive to radiation than an adult, so we are particularly careful about X-rays during pregnancy. There is no problem with something like an X-ray of the hand or the chest because the radiation does not go anywhere near the baby. However, special precautions are required for examinations where the womb is in, or near, the beam of radiation. If you are about to have such an examination and are a woman of childbearing age, the technologist will ask you if there is any chance of your being pregnant.

Points to remember

Every effort is made to keep radiation doses low and, wherever possible radiation doses from X-ray examinations are small in relation to those we receive from natural background radiation, ranging from the equivalent of a few days' worth to a few years.
You should make your doctor aware of any other recent X-rays or scans you may have had, in case they make further examinations unnecessary.
The risk to your health from not having the examination is likely to be very much greater than that from the radiation itself.