

## Plain Radiography/X-rays

### Consumer Information

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### What is Plain radiography/X-rays?



Figure 1: Chest X-ray. Bone (collar bone and back) appears light grey. Air (lungs and stomach gas) appears dark grey.

Radiography is the imaging of body structures using X-rays. X-rays are a form of radiation similar to visible light, radiowaves and microwaves. X-radiation is special because it has a very high energy level that allows the X-ray beam to penetrate through the body and create an image or picture.

The image is created due to the X-ray beam being absorbed differently by different structures or parts in the body. A dense structure like bone absorbs a high percentage of the X-ray beam (which appears light grey on the image), whilst low density structures like soft tissues absorb a small percentage (which appears dark grey on the image). The body has many different structures of varying densities and this difference creates a picture or image (see *Figure 1*).

### How do I prepare for Plain radiography/X-rays?

For a plain X-ray there are no specific preparation instructions but there are some important things you need to do:

Ensure you remember to arrive at the X-ray department with the X-ray order (request form or referral letter) from your doctor. This is a legal requirement and no X-ray examination can be performed without it.

Please inform your own doctor or the radiographer who is performing the X-ray if there is any chance you may be pregnant. This is important information as a different approach may be needed or even a different test altogether may be required. Safety of the patient and unborn child is the number one priority.

Be prepared to wear a hospital gown. This ensures the X-ray is of the highest quality as some clothing can make it difficult to see the images clearly.

Be prepared to remove certain items like watches, necklaces and certain types of clothing that contain metal objects such as zips, as these items may interfere with the quality of the image.

### What happens during Plain radiography/X-rays?

The following are the steps involved in a typical plain radiography/X-ray:

1. A radiographer (a trained X-ray technologist) will call your name and escort you through to an X-ray examination room.
2. They will explain the procedure and prepare you accordingly (as above).
3. Depending on the part of your body being examined the following will vary:
  - Your position (e.g. standing, sitting or lying)
  - The number of X-rays taken
  - The of the speed of the test
4. It is important that you stay completely still when the radiographer instructs you to, as any movement may create a blurred image.
5. After the X-rays have been performed, the radiographer has to process each X-ray and check the results for quality. This can sometimes take several minutes.
6. Sometimes there will be a need for additional images to be taken to obtain more information to help the radiologist make a diagnosis. There is no need for concern if this happens as it is quite common. In most cases the extra X-rays are performed to obtain a better view of your anatomy or body structure, not because there is a problem.
7. The radiographer will instruct you when the procedure is finished. You may wish to ask them when the results will be available.
8. A radiologist (specialist X-ray doctor) then carefully assesses the images, makes a diagnosis and produces a written report on the findings. This report is sent to the referring doctor, specialist or allied health professional who referred you for the test.
9. At any stage you are welcome to ask questions about the process if you have any concerns.

The entire process is straightforward and you will not feel anything strange or feel any different during the examination.

X-ray examinations are fast. Most procedures are quicker than 15 minutes (depending on the part of the body being X-rayed).

## Are there any after effects of Plain radiography/X-rays?

X-rays are invisible and you will not feel anything while the X-ray is being taken or afterwards.

## How long do Plain radiography/X-rays take?

It usually takes less than 15 minutes for an entire X-ray procedure. This obviously depends on the number of parts of your body being examined and your mobility, i.e. your ability to move about, and your general health. In most cases, the area being examined needs to be viewed from different directions to obtain enough information to make the diagnosis and this may require you to move into different positions.

For example, a simple chest X-ray on an able and willing patient could take less than 1 minute. However, a distressed patient needing a full spine, pelvis, both shoulders and both legs X-rayed could take 45 minutes.

People with disabilities and children will also take longer, particularly if they find it difficult to keep still or to cooperate with or understand instructions given by the radiographer (medical imaging technologist) who performs the X-ray examination.

## What are the risks of Plain radiography/X-rays?

Generally, the benefit of the X-ray procedure is far more important than the small estimated risk. At the radiation dose levels that are used in diagnostic radiography there is little or no evidence of health effects (see *Radiation Risk of Medical Imaging for Adults and Children*).

There are two major risks to health that occur as a result of exposure to medical ionizing radiation (which is the kind of radiation in X-rays). These are:

- Cancer occurring many years after the radiation exposure; and
- Health problems in the children born to people exposed to radiation because of damage to the reproductive cells in the body.

Medical research has as yet been unable to establish conclusively that there are significant effects for patients exposed to ionizing radiation at the doses used in diagnostic imaging. In addition, the dose of radiation that you receive from plain X-rays is very much lower than for other types of radiology procedures such as Computed Tomography (CT) scanning or angiography (X-ray examination of the blood vessels).

To put this all into perspective, a patient would need to have approximately 38 chest X-rays to receive an amount of radiation similar to that of normal background radiation that everyone receives for one year from the environment (ARPANSA 2008). This is very encouraging and supports the use of the small doses involved in diagnostic radiography.

## What are the benefits of Plain radiography/X-rays?

The benefits of plain radiography/X-ray are:

- X-ray imaging is useful to diagnose disease and injury such as pneumonia, heart failure, fractures, bone infections, arthritis, cancer, blockage of the bowel, and collapsed lung, etc.
- X-ray imaging is fast and easy so it is particularly useful in emergency diagnosis and treatment.
- X-ray equipment is relatively inexpensive and widely available in hospitals and X-ray clinics and other locations, making it convenient for both patients and doctors, even in remote locations.

It is worth noting that Dr Brad Cassels (Manager, Radiation Safety, DHS) suggests that there haven't been any hereditary effects observed in human populations (Monash Workshop 2007).

## Who does the Plain radiography/X-rays?

A [radiographer](#) or medical imaging technologist (MIT) is a health professional who performs diagnostic radiography.

A [radiologist](#) is a specialist medical doctor who reviews and interprets the images and provides a written report of the test to your referring doctor, specialist or allied health worker.

## Where are Plain radiography/X-rays done?

Plain radiography/X-rays are done in the diagnostic imaging department of most hospitals (although this depends on the size of hospital as some small hospitals do not perform X-rays). They can also be done at a private radiology practice.

## When can I expect the results of my Plain radiography/X-rays?

The time that it takes your doctor to receive a written report on the test or procedure you have had will vary, depending on:

- the urgency with which the result is needed
- the complexity of the examination
- whether more information is needed from your doctor before the examination can be interpreted by the radiologist
- whether you have had previous x-rays or other medical imaging that needs to be compared with this new test or procedure (this is commonly the case if you have a disease or condition that is being followed to assess your progress)
- how the report is conveyed from the practice or hospital to your doctor (in other words, email, fax or mail)

Please feel free to ask the private practice, clinic, or hospital where you are having your test or

procedure when your doctor is likely to have the written report.

It is important that you discuss the results with the doctor who referred you, either in person or on the telephone, so that they can explain what the results mean for you.

### Further information about Plain radiography/X-rays:

X-rays are safe when performed in a controlled environment like an X-ray department. X-ray equipment is checked regularly to ensure that it is functioning properly and not delivering excess radiation to patients or staff. People operating X-ray equipment are required by law to be licensed to do so, to ensure they are properly qualified to operate the radiation equipment.

If you require any more information or have queries about your X-ray procedure then please contact your local doctor or the hospital department/private radiology practice where you have been referred for the X-ray examination.

### Useful websites about Plain radiography/X-rays:

The following websites are helpful sources of information:

- Radiation and health fact sheets (ARPANSA)  
<http://www.arpansa.gov.au/RadiationProtection/Factsheets/index.cfm>
- International Commission on Radiological Protection  
<http://www.icrp.org/>
- Australian Institute of Radiography  
<http://www.air.asn.au/>

### References:

- ARPANSA 2008, *Radiation Protection*, viewed 25 September 2008  
<http://www.arpansa.gov.au/RadiationProtection/Factsheets/index.cfm>
- ICRP 2008, *International Commission on Radiological Protection*, viewed on 25 September 2008  
<http://www.icrp.org/>
- Budd, R 2007, *Radiation Protection Seminar*, presented on 25 August 2007, Monash University.

#### Please note:

This information is of a general nature only and is not intended as a substitute for medical advice. It is designed to support, not replace, the relationship that exists between a patient and his/her doctor. It is recommended that any specific questions regarding your procedure be discussed with your family doctor or medical specialist

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