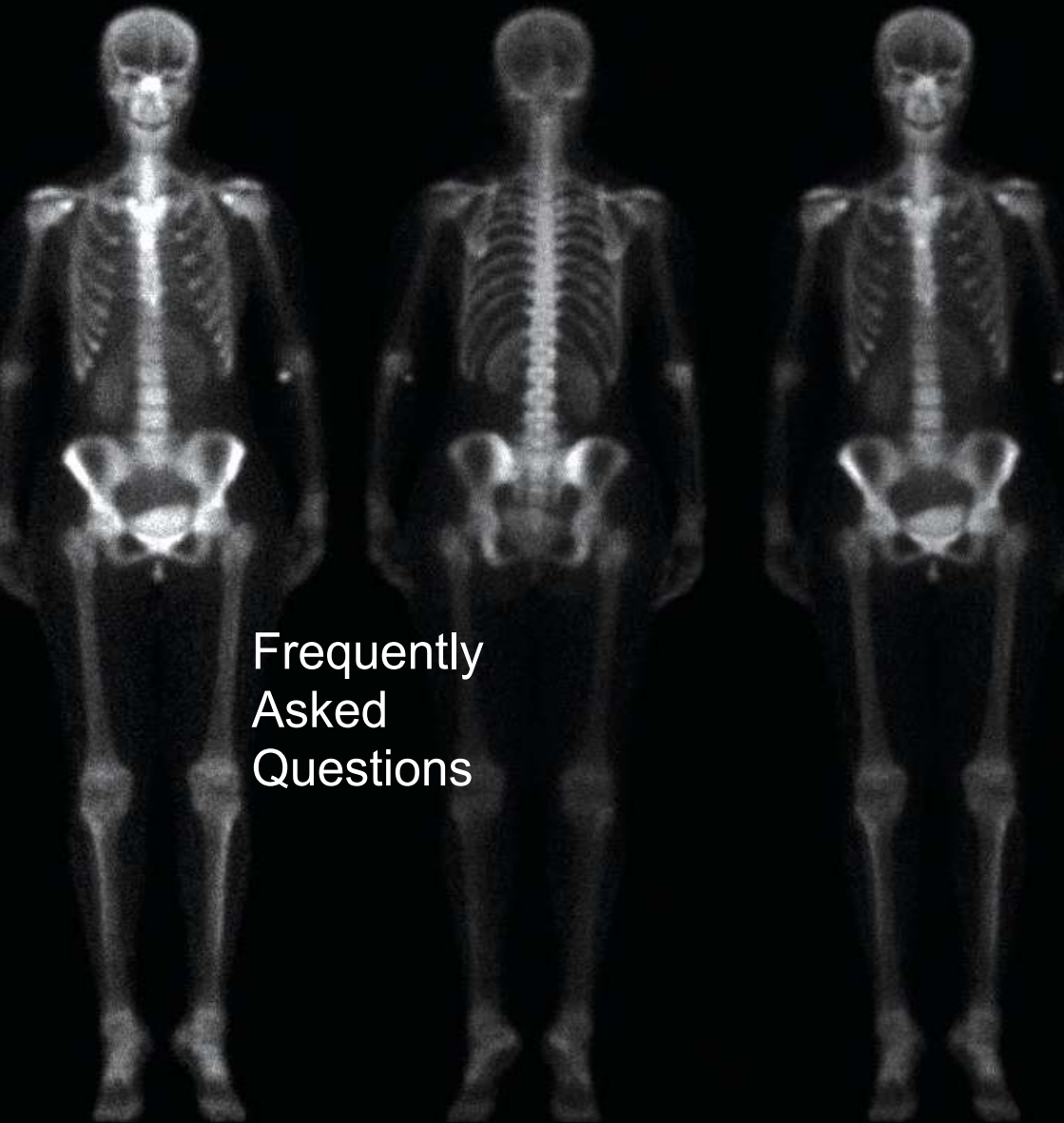




# Cabrini Medical Imaging

## What is Nuclear Medicine?



Frequently  
Asked  
Questions

# What is Nuclear Medicine?

## Frequently asked questions

**Nuclear Medicine is a branch of medicine that uses radioactive isotopes to provide information about the function of specific organs. This information enables Doctors to provide a quick, accurate diagnosis of conditions such as cancer, heart disease, thyroid disorders and bone disease, such as fractures. In some cases, radiation is used to treat the condition.**

### Why is it used?

Nuclear medicine enables doctors to diagnosis of a wide range of diseases. The scans are very sensitive to small changes in normal function. This allows treatment to begin as early as possible, which means it has a far greater chance of being fully effective.

The scans are painless and expose patients to only minimal amounts of radiation. Nuclear Medicine provides information about the functioning of organs, and whether or not they may be diseased.

Nuclear Medicine is used to diagnose cancer, stress fractures, heart disease, bone disease, blood clots in the lungs and many others.

It can also be used to asses kidney function, liver function, gall bladder function, heart function and test the function of almost any organ in the body.

Therapy using nuclear medicine is an effective, safe and relatively inexpensive way of controlling, and in some cases eliminating, conditions such as overactive thyroid, thyroid cancer and arthritis.

### What is radiation?

Radiation is a type of energy that exists in our environment in many forms. It comes

from natural and man-made sources. Visible light and the warmth from the sun, are natural forms of radiation. Examples of man-made radiation include; microwave radiation that is used for cooking, and radio waves used for communication over long distances.

Ionising radiation comes from both natural and man-made sources. It comes from outer space, the sun, the earth, the air and our food and drink, and from building materials such as concrete, bricks and mortar. This is the natural background radiation to which everyone is exposed. Nuclear medicine studies use ionising radiation, as do x-rays, CT, DEXA, Angiography, Fluoroscopy and Barium studies.

### Is nuclear medicine dangerous?

Nuclear medicine is extremely safe because the radioactive tracers, or radiopharmaceuticals, used are quickly eliminated from the body through its natural functions. In addition, the tracers used rapidly lose their radioactivity.

In most cases, the dose of radiation used for the scan is very small. For example, a patient having a lung scan is exposed to the same dose of radiation they would receive from two return air flights between Sydney and London.

### Will I glow in the dark?

No you won't. The radioactivity used in Nuclear Medicine is very short lived. Technetium is used for 90% of all scans. It has a six hour half life, and so it is completely decayed after 24 hours.



Above:  
Gamma  
Camera  
at Cabrini

## How radioactive will I be?

For some scans a minute, almost undetectable dose is given. There are no restrictions in these instances. For other types of scans a larger dose is required and you may be given specific instructions regarding the radiation dose. You may be asked to restrict your contact with pregnant women and babies as they are more sensitive to the radiation that is being emitted from your body. In almost all cases, you will be able to continue your normal duties after the scan.

## Is it new?

Nuclear Medicine was first used in the late 1800s after radioactivity was discovered. Radioactive iodine was first used in 1905 to treat thyroid disease. Due to the limits of computer processing power, major advances in Nuclear medicine imaging did not occur until the mid 1950's.

The first nuclear medicine department opened in Melbourne in 1965. Cabrini Health started scanning patients in 1974.

## How are radiopharmaceuticals produced?

Australia is one of a few countries that produce the radioactive tracers necessary for diagnostic nuclear medicine. If we were not able to produce them here, we would have to import them from as far away as Europe or North America.

The radiopharmaceuticals are manufactured at the nuclear research reactor in Lucas Heights, or the cyclotron, near Sydney. Some isotopes need to be imported from Europe.

## What can the scans detect?

Scans using radiopharmaceuticals can diagnose all sort of conditions. Scans of the heart, thyroid, lungs and kidney are common. Most scans involve the skeleton. These are usually carried out to diagnose infection, tumour spread, fractures and sports injuries.

## Should I prepare for a scan in any way?

Some scans may require special preparation. As with all scans involving radioactivity, if you are pregnant, or think you may be, or if you are breastfeeding, you must tell us before the scan begins.

It is important that you read all the material given to you prior to your appointment. For a Thallium scan, you may be asked to stop some medications, avoid caffeine or fast for a period of time prior to the scan.

If further information is required, please ring Cabrini Nuclear Medicine on (03) 9508 1429.

## What happens during the scan?

When you undergo a scan, a radioactive injection (known as a radiopharmaceutical) will be given, either by injection into a vein, by mouth or through a breathing device. The radiopharmaceutical will concentrate in the particular part of your body under investigation.

Sometimes you may have to wait for a few hours, or even a day or two, after the pharmaceutical has been administered for the scan to be done. This is because it may take a while for the pharmaceutical to concentrate in the part of your body to be examined.

After the injection, the radioactivity continuously gives off invisible radiation, known as gamma rays which are detected by the scanner.

A technologist uses a special camera called a gamma camera to detect the location of the radiopharmaceutical in your body. During your scan, the camera will be positioned very close to the part of your body being scanned. If you are claustrophobic, please notify the staff before the injection.

Computers enhance the camera images on a screen. Doctors will be able to tell if the part of your body being tested is functioning normally. A copy of the images will be sent to your doctor.

### **Will it hurt?**

Most scans involve an injection into a vein, rather like the one you'd have for a blood test.

### **Will I have to stay in hospital?**

Most scans only require you to stay for a few hours in the nuclear medicine department, although in some cases patients are asked to return for a number of visits or to stay in hospital for a short period.

If you are undergoing therapy, particularly for an overactive thyroid gland, you will probably be treated as an outpatient and won't need to stay in hospital. For larger doses you may need to stay in hospital for two or three days. This is not because of any risk to your health but because doctors want to ensure that the remnants of the radiopharmaceuticals are dealt with safely when they are excreted from your body.

## **What is a nuclear medicine therapy?**

By far the widest application of nuclear medicine is for diagnosis. However, there are a number of occasions when radioactive materials are used to treat certain conditions, particularly cancer. This is known as therapy. Nuclear Medicine can treat conditions such as overactive thyroid and thyroid cancer.

Some treatments involve an injection of radio-pharmaceuticals into a vein. This may be done for the relief of pain from tumours that have spread to bone.

## **Who performs nuclear medicine procedures?**

Nuclear Medicine scans are performed by a team of allied health staff, who are specifically trained in Nuclear Medicine. Doctors, technologists, nurses and pharmacists will ensure that you receive a high level of care and that your doctor is provided with accurate reports on your condition.

## **Will there be any side effects?**

Side effects are extremely rare for Nuclear Medicine scans. You will not feel any hot flushes, burning sensations or nausea. You will be able to drive yourself home.

## **What happens after the scan?**

The specially trained physicians will report on the scans appearance and send the results to your doctor to evaluate.

