

tests

& scans

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THE
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GUIDE

TO MODERN
DIAGNOSTICS



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FACT

The Alfred has a long and proud history of supporting men's health. To support The Alfred call 1800 888 878.

**This booklet should be read in conjunction with advice provided by your GP or specialist doctor.*

FOREWORD

Tests and scans play a vital role in helping doctors quickly diagnose their patients. This guide aims to explain the most common tests, how they work, what to expect and how to prepare if you are referred for one.

There is a reasonable chance that one day you'll need one of the tests outlined in this booklet. But don't worry – they're mainly non-invasive. And they can provide vital information to your doctors.

Today's precise tests mean that problems can often be spotted before they advance further. Most procedures highlighted in this booklet are painless and simple. The ones that do cause discomfort require light anaesthesia and most patients only need a day in hospital.

“We hope this guide will encourage you to have tests, if needed, so any problems are diagnosed early. Most of our patients at The Alfred are men.”

At The Alfred in 2010, men made up:

- ▶ 68.5 per cent of people rushed in with challenging and life-threatening conditions;
 - ▶ 74 per cent of burns victims;
 - ▶ 76.5 per cent of people with sports-related injuries; and
 - ▶ 64.5 per cent of road accident victims.
- GPs and specialists will refer you for the right test if they think you need it. Following investigative tests, in most cases you'll soon have an answer to your questions. This booklet is a valuable resource, and one you can refer to for years to come.

I wish you all good health.

*Professor Ken Thomson,
Director of Radiology*

BLOOD TESTS

Blood tests are very common. When you have routine checkups, your doctor may recommend blood tests to see how your body is working.

Blood tests help doctors check for certain diseases and conditions. They also help check the function of your organs and show how well treatments are working. Blood is made up of different cells and other compounds. We can become ill if organisms infect our blood.

“Doctors often use blood tests as a first step in investigating a problem.”

How do they work?

Blood consists of two main elements: plasma and cells (red, white and platelets). Doctors perform several tests with blood samples to get the information they need. These include a blood smear test and measurement levels of the cells. In a blood smear, laboratory workers look at blood under a microscope. Abnormalities in the number or the size of blood cells can point to different diagnoses. For instance, a high white blood cell count may be due to a bacterial infection, and high platelet counts (very small cell fragments) could make somebody vulnerable to blood clots.



Common tests include:

- ▶ U+E - checks electrolytes and kidney function
- ▶ Liver Function Tests - used when a patient has symptoms such as jaundice, nausea, loss of appetite, unusual weight change or stomach pain
- ▶ Full Blood Examination or Full Blood Count – can pick up anaemia and infections
- ▶ Cholesterol – a common test as high cholesterol is a factor in coronary artery disease
- ▶ CRP High-sensitivity – helps predict risk of developing heart disease
- ▶ Glucose/blood sugar levels – when diabetes is suspected
- ▶ PSA – to help detect and to monitor prostate cancer



Pre-test tips

- ▶ Sometimes fasting is required. Your doctor will let you know.
- ▶ Advise your doctor if you have a problem with needles or blood and think you may feel faint.

Procedure

Most blood samples are taken from a vein (which carries blood to the heart). A cord is tied tightly around the upper arm to make the vein prominent, the injection site is cleaned and a needle is put into the vein to collect a blood sample.

A small prick in the finger might be all that is needed if only a few drops of blood are required.

If blood is taken from an artery (which carries blood away from the heart), it is usually taken at the wrist where there is an artery that is very close to the skin.

After procedure

After taking blood, cotton wool is held over the wound for a minute or two before a sticking plaster is applied. Most people feel fine, but sit for a while if you feel at all dizzy.

“Blood tests can identify a problem before it even becomes apparent.”

Benefits

When a blood test reveals an abnormality, action can often be taken early enough to prevent a serious disease developing.

Limitations

An abnormal blood test result does not necessarily mean that there is something wrong. Doctors look at test results along with other factors, such as symptoms, medical history and the results of a physical examination.



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CT SCAN

A CT (or Computed Tomography) scan is a special kind of X-ray machine. It can image all body structures at once including bone, blood vessels and soft tissue.

“CT scans are non-invasive, painless and relatively safe procedures that don’t require any recovery time.”

CT scans can diagnose conditions including kidney stones, liver disease, spread of cancer (metastasis), tumours and cysts, strokes, aneurysm and fractures.

How does it work?

CT uses advanced X-ray technology. Several X-ray beams are sent through your body simultaneously from different angles and data is collected on the relevant body part (for example, chest or head).

As the images are displayed immediately, the radiologist can use a CT scan to find exactly where tumours are, or pinpoint spots for pain relief injections or fluid drainage.

Pre-scan tips

- ▶ Let your doctor know if you have diabetes, previous allergy to contrast dye, kidney or thyroid gland problems.
- ▶ Let the booking clerk know if you weigh more than 180kg.
- ▶ Many CT scans involve X-ray contrast dye. If that is required, don't eat or drink for four hours prior.
- ▶ Always bring any prior, relevant CT scan images with you to the examination.
- ▶ CT scans should not be performed if there is a possibility you are pregnant.

FACT

In 1978, The Alfred was the first public hospital in Australia to install a machine capable of a full-body scan.



Procedure

A CT scanner looks like a large doughnut. You lie on the bed, with the body part under examination (for example, chest or head) in the right spot so the scanner can take pictures of the body. The scanner doesn't touch you.

The X-ray ring rotates as you are moved through the scanner. There can be clicks and buzzes as the machine works. You will be asked to keep still, and may need to hold your breath occasionally so images are clear.

A CT scan takes between five and 30 minutes. You might need a repeat scan, before and after an injection of contrast dye into a small tube in your arm. The dye produces a slightly warm sensation as it circulates, particularly in the pelvis.

After procedure

If you've had contrast dye injected, drink plenty of fluid throughout the day to help flush it from your body. You may feel flushed, or a bit nauseous, or have a salty or metallic taste in your mouth.

A few people can have an allergic reaction to the contrast (call your doctor if you have any concerns or notice side effects such as an itchy rash or 000 if you have more serious breathing problems). Your doctor will discuss the results with you.

“CT has revolutionised radiology and changed the methods of diagnosis for many diseases.”

Benefits

CTs can often detect early brain tumours and determine the spread of cancers in the lungs and abdomen. CT is available almost everywhere in Australia.

Limitations

A CT scan does not show soft tissue organs such as the brain, internal pelvic organs, the muscles or ligaments and cartilages of joints nearly as well as an MRI.

People heavier than 200kg may be over the weight restriction for the machine's moving table.

Your doctor will ensure that the benefit of a CT outweighs the minor risk of the radiation you will receive. You should not have multiple CT scans without good medical reasons.



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X-RAYS

X-rays are used to look inside the body. They can show if a bone is broken or if there is a shadow on a lung.

Special X-ray techniques can also be used to investigate soft tissues of the body. In these cases, you may need to swallow a contrast dye (or it may be given as an enema through the rectum, or injection).

Doctors can then examine areas such as blood vessels, the digestive tract, and the bowel.

How does it work?

X-rays are a type of radiation, just like light is a type of radiation. X-rays have a much higher frequency than light, so we can't see them. X-rays can pass through the human body, which makes them ideal for looking inside the body.

Pre-test tips

- ▶ Wear light, comfortable clothing without buttons, zips or buckles around the area being X-rayed. Then you may not need to change into a hospital gown.
- ▶ Let the booking clerk know if you weigh more than 150kg.

Procedure

An X-ray will take about 10 minutes, unless multiple body areas need to be X-rayed.

After procedure

The radiologist's report and images will be given to your doctor.

“X-rays are painless, fast, easy and ideal for diagnosing fractures and many other problems.”

Benefits

The amount of radiation you receive during an X-ray is small. The techniques and equipment used minimise exposure. Lead aprons and other types of shields can be used to protect your reproductive organs and other parts of the body.

Limitations

X-rays are not always useful for seeing more complex problems or deep within the body.

FACT

Various parts of the body appear light or dark due to the different rates that tissues absorb the X-rays. Bone calcium absorbs X-rays the most, so bones look white on the radiograph. Fat and other soft tissues absorb less and look grey. Air absorbs least, so lungs appear black.



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MRI

Magnetic Resonance Imaging (MRI) is an advanced imaging technique. MRI does not involve exposure to radiation. It is safe, non-invasive and painless.

An MRI is used to investigate or diagnose conditions such as tumours, joint or spinal injuries or diseases, soft tissue injuries or diseases of internal organs such as the brain or heart.

How does it work?

MRI uses a magnetic field and radio waves to take pictures of inside the body.

The MRI scan consists of a table that slides into a large cylinder. Strong magnetic field and radio waves are applied to the body part being assessed.

The scan operator can take cross-sectional images of the patient's body from almost any angle. If necessary, a contrast dye is injected so your doctor can see blood supply.

Pre-scan tips

- ▶ Metal implants, some aneurysm clips and pacemakers are not safe inside the MRI machine. Some metal pins, piercings, make up, medical pumps and other implants may affect image quality. Advise if you have any of these.
- ▶ You may need to complete a questionnaire on your medical condition.
- ▶ Talk to your doctor if you are worried about being in a small space. Your doctor can suggest ways of reducing anxiety during the scan (such as listening to music). You may even be able to be sedated. You can communicate with staff through an intercom during the scan.



Procedure

The MRI scanner is a large tubular machine with a sliding bed in the centre. It is normal to hear loud tapping and knocking sounds during preparation and scanning.

Earplugs are used for patient comfort.

An instrument called a 'coil' is often placed across the patient over the area being examined. It works as an antenna to receive the image signal.

The scan can take from 15 minutes to more than an hour. You will need to keep completely still for short periods. Most people feel no unusual sensation, although some notice slight warmth during the scan.

After procedure

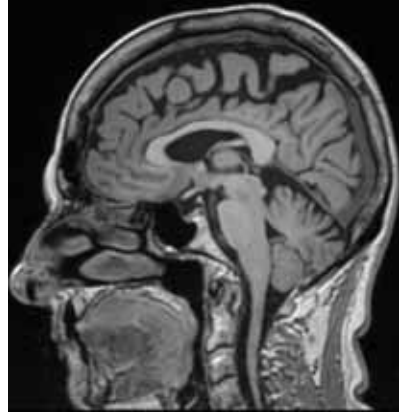
Most patients can leave immediately.

If you had a sedative, you'll be observed until ready to be taken home for a rest by a friend or relative. Your doctor will discuss the results with you.

Benefits

MRIs provide superb definition of soft tissues. Doctors can see areas of the brain and other internal organs, spinal cord, solid organs, muscles, ligaments and cartilage in great detail.

MRIs can detect with accuracy early brain tumour, stroke, spinal cord injury, cardiomyopathy, bone marrow disease and musculoskeletal injury. Some breast cancers not visible on mammogram and ultrasound can be assessed with the help of MRI.



MRI scan of brain.

“MRI can also be used to assess tumour blood flow and cancer spread, without the need to proceed directly to surgery or biopsy.”

Huge advancements in MRI research have led to the development of new MRI techniques such as brain functional mapping, allowing a neurosurgeon to plan the best path of approach prior to surgery.

Limitations

You need to go to a hospital for an MRI scan.

ULTRASOUND

Ultrasound is not just used in pregnancy. Usually non-invasive and painless, it is ideal for looking at solid organs.

Ultrasound is often used to investigate abdominal pain, nausea, vomiting and abnormal lumps. Ultrasound may reveal gallstones, pancreatitis, appendicitis or problems such as cirrhosis of the liver.

“Ultrasound can also diagnose tumours, find foreign objects in the body (such as a bullet), or check the heart’s aorta for an aneurysm. Ultrasound can even scan the inside of your eye.”

Blood flow in certain areas of the body can be scanned by a ‘doppler’ ultrasound, usually in the neck or leg, to check for blood clots, narrowing of vessels or tumours. Ultrasound is also useful to see if cancer has spread in some parts of the body.

How does it work?

Ultrasound uses sound waves to produce an image. A small plastic hand-held device, called a transducer, is held against your skin and sound waves are sent into the body. The waves bounce off the internal organs and echo back to the transducer. They are converted to images that show on a screen. Ultrasound doesn’t use ionising radiation.

Pre-scan tips

▶ You may need to fast for a few hours or drink water. Some scans of the bladder will require you to fill your bladder and then empty it so doctors can see if there is any problem in emptying it.

▶ Be prepared for the sonographer to ask you personal questions about your health or condition, which will ensure a thorough examination is performed.

Procedure

A sonographer performs the ultrasound, which usually takes about 30 minutes. Gel is applied to the body part to be scanned and the transducer will be placed over that area. You may be asked to move into different positions. For certain conditions, an internal ultrasound may be needed as well, for instance a probe in the rectum (for some prostate examinations) or the oesophagus (for some heart examinations).

FACT

- ▶ Ultrasound uses sound waves that are far above the frequency heard by the human ear.
- ▶ Ultrasound is a form of medical sonar – sonar is sound navigation and is used to measure distance under water using sound waves. Underwater sonar detection systems were developed for the purpose of underwater navigation by submarines in World War I and in particular after the Titanic sank in 1912 and used to detect icebergs two miles away.

After procedure

Your doctor will discuss the results with you. More tests might be needed.

Benefits

Most ultrasound scanning is non-invasive (no needles or injections), usually painless and clearly shows soft tissues that do not show up well on X-rays.

“Ultrasound is great because it’s a dynamic exam.”

The images show the organs moving. If there are gallstones, for instance, the sonographer can roll the patient and see if the gallstones move or if they are blocking the bladder.

Ultrasound is ideal for guiding needle biopsies. It can be used to guide a needle into an organ to ensure the precise spot is biopsied, or it can be used to highlight cancerous areas for radiotherapy. It can also be used in an operating theatre following cancer surgery, for example, to see if the remaining organ is cancer free.

Limitations

Ultrasound waves see through water but not through gas or air. A CT scan would be needed to see structures deeper in the body, such as the stomach and bowel. Ultrasound can only image the outer surface of bones, so MRI is better to see inside joints and bones. Also, obese people may need a CT scan for better images.

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ENDOSCOPY

In an endoscopy, a thin, lighted tube is inserted through the mouth or anus to see inside the body and search for disease.

This can mean you can avoid complicated investigations and major exploratory surgery. Endoscopy can also treat some conditions. The endoscope can be fitted with an electric probe to destroy abnormal tissue or remove rectal or colonic polyps, for knee joint surgery, and some types of gallbladder removal.

“Special endoscopes can perform simple surgical procedures, such as removing some tumours, biopsy suspicious tissue, remove stones from the bile duct and to place stents through blockages.”

You usually need to be admitted to hospital for an endoscopy. If it's a simple procedure, you'll probably go home that day.

More complicated procedures may mean you'll stay overnight. Recovery time is rapid – just a few hours or perhaps a day.

How does it work?

The endoscope has a lens and tiny camera that allows doctors to look inside the body. Light passes down the tube to the relevant area and the images are magnified onto a screen.

Below are some of the most common endoscopies.

COLONOSCOPY

This is used to inspect the large bowel (colon). A tube is inserted through the anus to check for tumours, polyps (small growths) and other conditions. This is a common check for bowel cancer. This test is also done if you have unexplained diarrhoea, bleeding, pain or anaemia or polyps that require further investigation. A colonoscopy aims to avoid or minimise the need for surgery.

Pre-procedure tips

- ▶ Tell your doctor about any allergies or medical conditions, especially any heart and lung problems or diabetes.
- ▶ You will need a special diet before the colonoscopy.
- ▶ You will be given a preparation kit. The day before, you will need to drink a laxative fluid to empty the bowel so your doctor can get the best possible view of the large bowel.

- ▶ Do not eat or drink anything for six hours beforehand.
- ▶ You will be sedated before the procedure so you probably won't remember anything of the colonoscopy, which will take 20 to 45 minutes.

After procedure

You will be in recovery for about two hours. You may feel a little bloated due to the gas inserted during the procedure.

The doctor will let you know what they found, if anything. Somebody will need to drive you home. Do not drive for 12-24 hours after the colonoscopy to allow sedatives time to wear off.

GASTROSCOPY

A tube is inserted into the mouth and down into the oesophagus, stomach and first part of the small bowel. A gastroscopy can check for conditions including ulcers, reflux, tumours, coeliac disease, and to investigate bleeding, abdominal pain, nausea and difficulty swallowing.

It is a minor procedure, light sedation is used and patients don't usually remember anything afterwards. A biopsy may be taken during the procedure. This procedure may also be done to remove polyps, stretch a narrowed area or treat conditions such as bleeding ulcers.

Pre-test tips

- ▶ Tell your doctor about any allergies or medical conditions, especially any heart and lung problems or diabetes.
- ▶ Have nothing to eat or drink six hours before the procedure. You must also stop smoking and chewing gum for this period.

After procedure

Somebody will need to drive you home. Do not drive for 12-24 hours after the gastroscopy to allow sedatives time to wear off.

ENDOSCOPY

CAPSULE ENDOSCOPY

In this newer type of endoscopy you swallow a capsule that contains a tiny camera.

“It can take two images per second for up to 12 hours and is used to view the small bowel.”

Just as food does, the camera passes through the stomach and gastrointestinal system. Images are sent to a recorder on a belt you will be wearing. You can go about your normal business. The doctor later downloads and checks the images.

Patients must have had a gastroscopy and colonoscopy with no cause found, before this extra investigative test. The capsule causes no discomfort and is excreted naturally.

Pre-test tips

- ▶ Fast six hours before taking the capsule.
- ▶ Avoid strongly coloured foods and iron tablets 24 hours prior.

After procedure

Don't drink anything for two hours after the capsule is swallowed. Don't eat solid food until four hours after swallowing the capsule. Stay away from large transmitters (such as television towers) and airports as there may be interference to images being collected.

FLEXIBLE SIGMOIDOSCOPY

This 1cm-wide tube allows doctors to inspect the lining of the rectum and lower part of the colon. A biopsy may be taken of polyps inside the colon, or for further assessment.

Pre-test tips

- ▶ No bowel preparation is required – a small enema is given just before the procedure.
- ▶ You will need to fast for six hours prior if you will be sedated for the procedure.
- ▶ You might feel pressure, bloating or cramping during the procedure.



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After procedure

You can drive afterwards as long as you weren't sedated.

There are also other types of endoscopy:

- ▶ **Bronchoscopy** - a tube is inserted down the windpipe to check the airways and lung tissue. This can be done to further assess lung diseases or after smoke inhalation.
- ▶ **Cystoscopy** - a tube is inserted into the urethra (which carries urine and semen) to inspect the urinary tract and bladder to check for abnormalities.
- ▶ In other types of endoscopy, the skin is opened to allow the scope to enter an area. This includes **arthroscopy**, which looks at torn ligaments or damaged cartilage in joints, typically knees.
- ▶ A **laparoscopy** involves a small cut on the abdomen to check injury or conditions affecting the abdominal organs.

Benefits

X-rays (for diagnosis) or surgery (for treatment) are the main alternatives to endoscopies.

“Having an endoscopy means you won't have any scarring, won't be in hospital for long, and will recover quickly.”

Endoscopies are usually painless, but may be a bit uncomfortable. An endoscopy is simple and low risk compared to surgery.

Limitations and risks

Complications are rare. There may be a small amount of bleeding or slight irritation of the lining of the organ that has been examined.

Prevention tips

You can help prevent some conditions that endoscopies investigate, such as polyps, cancer, inflammatory bowel conditions and ulcers.

- ▶ Eat healthily – a low fructose diet helps those with inflammatory bowel conditions
- ▶ Eat plenty of fibre
- ▶ Have a modest intake of alcohol
- ▶ Don't smoke.

FIBROSCAN

This is a non-invasive device that can assess liver damage. This test can be used to diagnose liver cirrhosis, severity of liver disease or to assess scar tissue in the liver (fibrosis).

This test is usually carried out on people with hepatitis C, hepatitis B, fatty liver or alcohol-related liver disease, and for those with the bleeding disorder haemophilia. It can also be used to measure liver damage over time.

“The Fibroscan sends a mechanical vibration through to the liver.”

How does it work?

Ultrasound measures the speed at which this wave travels, then the image is converted into a reading that measures the elasticity or stiffness of the liver; the stiffer the liver, the more severe the fibrosis (scarring).

Pre-scan tips

No preparation is needed before a Fibroscan.

Procedure

The test takes five to 10 minutes and can be done in an outpatient clinic. You lie on your back, with your right arm raised behind the head while the device is run over the stomach.

After procedure

You can leave straight away and resume normal activities.

Benefits

Fibroscan is non-invasive and painless.

“In the past, patients required a liver biopsy, which meant inserting a needle into the liver.”

Liver biopsy can be painful, not always accurate and bleeding complications are possible.

Limitations

Fibroscan is very good at diagnosing and assessing both mild and severe liver disease – with 90 to 95 per cent accuracy.

It is not so good at differentiating between more moderate liver disease.

It can also be tricky getting an effective reading in people who are markedly overweight, in those with a pacemaker or those who have significant liver inflammation. In these cases, liver biopsy may still be necessary, with Fibroscan used as an extra tool.

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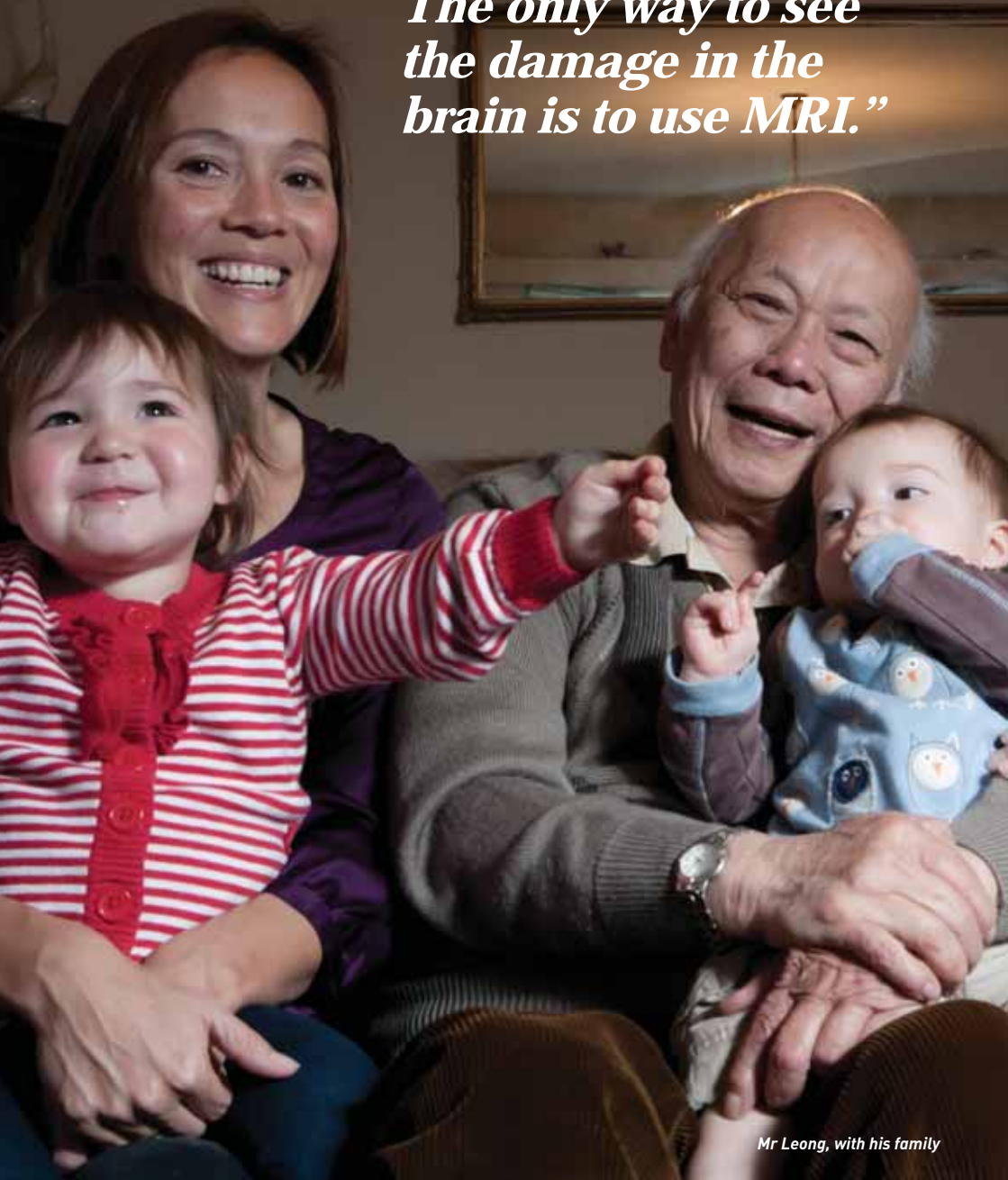


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*“The only way to see
the damage in the
brain is to use MRI.”*



Mr Leong, with his family



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The Alfred Fathers' Day Appeal*

When Kok Phooi Leong was rushed to The Alfred suffering headaches, dizziness and vomiting, his family was understandably worried.

Mr Leong had suffered a stroke and his prognosis on arrival to the hospital's Emergency Department appeared poor. Luckily, Mr Leong benefited enormously from the use of modern imaging, which showed doctors very clearly what was wrong.

Dr Judith Frayne, Senior Medical Specialist, Stroke, says that Mr Leong's stroke was due to the blockage of one tiny little vessel that supplies the very lower end of the brain stem.

"It's a very well known, very well described stroke but it can be a nightmare because it has a very unusual pattern of clinical presentation," she explained.

"You cannot see that stroke on a CT scan because it's too small and the stalk of the brain is buried in the bone. The only way to see the damage in the brain is to use MRI, which shows you whether it is the little vessel that's blocked or whether the larger vessels next to it are blocked as well. The MRI shows you how big the area of damage is," Dr Frayne added.

The MRI of Mr Leong's brain not only confirmed the diagnosis of stroke but also gave doctors a clear idea of what sort of recovery would be possible, despite the complication of many serious secondary infections which saw him admitted to Intensive Care.

"Seeing him in ICU you might think he wouldn't recover, but due to his MRI images we were pretty confident that most of his problems were secondary infections rather than a stroke itself. That empowered us to say 'we're going to hang in there' because his prognosis was good," Dr Frayne said.

"The MRI images showed a tiny area of damage and we knew if we could get him through the infections, he would be fine. Those images enabled us to work out the likely outcome and therefore make informed decisions about levels of care. MRI is a terribly useful early diagnostic tool."

Over five months in hospital, Mr Leong, 75, experienced the devastating effects of his illness - partial facial paralysis, memory loss, an inability to swallow which required the insertion of a stomach peg, an inability to communicate and persistent chest infections.

After a long journey of recovery and rehabilitation he was finally able to go home to a relieved family.

Recently, Mr Leong's daughter, Maggie Whitnall, wrote a letter to Alfred doctors to express the family's gratitude.

"Thank you for allowing our father every opportunity to live. Thank you for persisting when it looked as if all hope was gone."

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PET/CT SCAN

Positron Emission Tomography (PET) can give information about how an organ or system in the body is working.

“PET scans can detect cancer in its early stages, help monitor cancer treatment and check if the cancer is coming back.”

PET scans are also used to diagnose and assess conditions of the brain and heart. In combination with a CT scan, it helps determine the precise location of any abnormal tissue.

How does it work?

A very low dose of radioactive sugar is injected. As your body is scanned, doctors can see how parts are working by the way they absorb the radioactive sugar.

Cancers, for example, use glucose differently from healthy tissue – fast-growing cancer cells appear ‘brighter’ than normal tissue on the images.

Pre-scan tips

- ▶ Fast from midnight the night before the test to maximise the effectiveness of the injected tracer.
- ▶ Prior to the scan drink several glasses of water to remain well hydrated.
- ▶ Bring any previous relevant scans and reports.
- ▶ Contact lenses can't be worn during the scan.

Procedure

The PET scanner has a ring of detectors that surround the patient. It looks similar to a CT scanner.

Before the scan you will be given a small, painless injection of radioactive glucose. It won't make you feel any different. The procedure might begin immediately or you might have to wait a while until the glucose circulates.

The bed will move backwards and forwards through the scanner. The scanner may come very close to you, but it won't touch your body. The scanner will pick up the radioactive glucose in your body and display the images.

The scan takes about 40 minutes. It is completely painless and you won't feel any different after the injection, during imaging or after the scan.

After procedure

The radioactive glucose you are given remains in your body for a short time and some is passed through your body naturally. All traces of the radioactivity will be gone within nine hours of injection.

There are no restrictions to general routine following a PET scan.

A nuclear medicine specialist will study the images and send a report to your doctor, who will discuss the results with you.

“PET/CT scans reveal internal diseases and also the effectiveness of therapy.”

Benefits

Soon PET/CT scans will also be used to diagnose degenerative diseases of the brain.

Limitations

The test may be difficult for those with claustrophobia, but sedation is an option. Those with diabetes may require an adjustment of their medication to undergo this test.



DEXA

A lot of men consider osteoporosis – where bones become weaker and break more easily - a women's disease.

DEXA (or Dual Energy X-ray Absorptiometry) uses a special X-ray scanner to measure bone density, or thickness. It is usually used to diagnose or monitor osteoporosis and provides information about your risk of having a fracture due to loss of bone. It is fast and highly accurate.

How does it work?

The machine uses different energies to distinguish between bone and soft tissue. A scan is usually taken of the lower spine and one hip and sometimes of the forearm.

“One in three men in Australia over 60 will suffer a fracture due to osteoporosis.”

Pre-scan tips

- ▶ Stop taking calcium supplements for 48 hours before your test. Don't take medications for osteopenia or osteoporosis on the day of your test.
- ▶ You'll probably be weighed and measured before the scan to allow your results to be compared to general statistics. Any height loss can be tracked over time.



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✓ Low Lactose - less than 2g per 100g

Procedure

In a spinal scan you will need to lie on a padded table with your legs on a cushion, while you lie flat with one leg rotated slightly inward for a hip scan. A scan takes about 20 minutes.

The scan is safe and painless and you can resume normal activities immediately.

The scan and the radiologist's report will be sent to your doctor.

Benefits

Your doctor can use DEXA to decide treatments to prevent further fractures or bone loss. The scan emits much less radiation exposure than a standard chest X-ray or CT scan.

“DEXA is a very accurate test and is the best for assessing bone loss.”

Limitations

If you have had spinal surgery, a hip replacement or surgery requiring screws or pins, that area may not be scanned. DEXA scans should be performed at least one week after other radiological procedures (such as contrast dye, CT scans, MRI, angiogram or nuclear medicine studies). The scanner can misread dye in the body.

DEXA scans may not be suitable for people over 130kgs.

FACT

The risk of developing osteoporosis increases with age, particularly if you have a family history, inactive lifestyle, smoke or drink alcohol regularly.

EEG

An Electroencephalogram (EEG) measures electrical activity in the brain. It is mainly used to diagnose epilepsy, sleep disorders, head injuries, stroke and brain problems such as infection, bleeding or tumours.

“An EEG can also help assess a person’s chance of recovery after a change in consciousness.”

How does it work?

Sensors are attached to the scalp with gel and linked to a computer to measure brain waves. Typically, more than 20 electrodes are attached to your head.

Pre-test tips

- ▶ Thoroughly wash your hair to ensure the electrodes do not come into contact with any hair products.
- ▶ Tell your doctor if you are taking any medication – you may need to stop taking sedatives, muscle relaxants, sleeping aids or medicine to treat seizures before the test.
- ▶ For 12 hours before the test, do not eat or drink anything containing caffeine (such as coffee, tea, cola or chocolate).
- ▶ If you are having a ‘sleep deprived EEG test’, do not sleep the night before. Somebody will need to drive you to and from the test.

Procedure

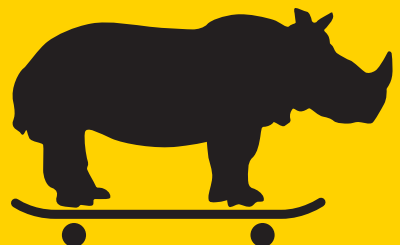
An EEG test usually takes a couple of hours. Sometimes brain waves during sleep also need to be tested. During the test, you will need to either sit or lie still with your eyes closed to ensure there is no electrical interference from muscle contractions.

If you suffer from epilepsy, speak to your doctor before the test as it may involve flashing lights which could result in a seizure in a very small number of patients. You may be asked to breathe deeply and rapidly to record what your brain does at that time.

“The EEG is a non-invasive test of brain function.”

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After procedure

A neurologist analyses the EEG and sends a report to your doctor.

Benefits

The EEG is a non-invasive test of brain function. An EEG is painless, safe and gives your doctor valuable information about how your brain is working.

Limitations

A 'normal' EEG might not rule out epilepsy. Sometimes, abnormal brain waves only happen during a seizure.

FACT

- ▶ There are several different brain waves – alpha waves (present only when awake when the eyes are closed, but disappear when the eyes open), beta waves (when you're alert) and delta and theta waves (found when asleep or in young children).
- ▶ In awake adults, a normal EEG shows mostly alpha and beta waves with two sides of the brain showing similar patterns of electrical activity. An abnormal result may show the two sides of the brain showing different patterns or sudden spikes in, or slowing of, activity.

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ECG

An Electrocardiogram (ECG) test detects heart abnormalities by measuring the activity generated by the heart.

This test can diagnose heart attacks, arrhythmia (abnormal rhythm), congenital defects, an enlarged heart, blocked arteries or inflammation.

Your doctor may want you to have an ECG if you have chest pain or are short of breath, dizzy or have an irregular heartbeat.

How does it work?

Electrodes on the arms and chest record the electrical activity of the heart muscle. The electrodes detect the electrical currents of the heart and are measured by the machine. Any damage to the heart muscle or irregularity in rhythm can change the electrical activity of the heart.

Pre-test tips

- ▶ Let your doctor know of any medications you are taking.
- ▶ You can eat and drink as normal before the test.

Procedure

Electrodes (sensors) are attached to the chest and limbs with suction cups or sticky gel, so you need to undress to the waist. If necessary, the chest is shaved.

You usually lie down still during the test, which only takes a few minutes.

Sometimes your doctor might order a stress test. The ECG is recorded while you ride an exercise bike or walk on a treadmill for up to 30 minutes.

Your doctor might want you to wear a holter monitor for 24 hours to check for intermittent symptoms. This is often used for people recovering from a heart attack to check things are working well, or for people with palpitations.

FACT

About 50% of heart attack patients had prior warning signs such as chest pain – but often dismiss it, as it was so mild.

After procedure

You can resume normal activities immediately afterwards (unless results show a problem).

Benefits

Electric currents are not sent into the body. Your doctor can interpret the results immediately.

“ECGs are a safe and non-invasive procedure and have no known risks.”

Limitations

An ECG may appear normal, even when there is significant heart disease. It is a static picture and may not reveal underlying problems when there are no symptoms. Your doctor might order a stress test if significant narrowing of the arteries is suspected.

In other cases, the heart disease may not cause electrical disturbance, so you might need a chest X-ray, MRI, angiography or an echocardiogram.



ANGIOGRAPHY

Angiography detects problems with blood vessels throughout the body. The images provide a 'roadmap' of the arteries and the veins.

An angiogram will often follow other tests as it can provide better information or guide treatment. The procedure can find narrowed or clogged arteries, measure blood pressure inside the arteries or veins, find sites of bleeding, identify the blood supply of tumours and identify blood vessel abnormalities.

How does it work?

Angiography uses X-rays and an image intensifier to take images. The doctor inserts a small tube into your blood vessel and injects contrast dye so the blood vessels can be clearly seen on a screen. The procedure can be performed in radiology, cardiology or in the operating theatres. Images of your blood vessels can help your doctor open blocked or narrow blood vessels, treat other diseases involving blood vessels, and treat tumours.

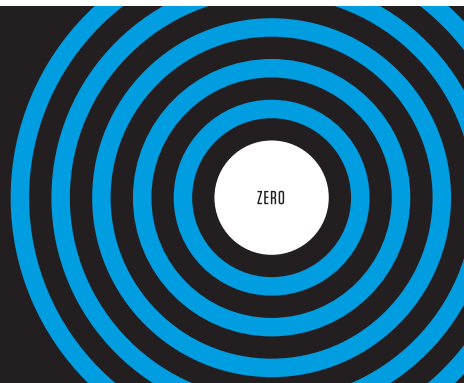
Pre-scan tips

- ▶ Tell your doctor if you have kidney problems, heart problems, high blood pressure, diabetes, take regular medication (especially warfarin), or have any allergy to contrast dyes used in X-rays.
- ▶ Drink clear liquids only for at least four hours before the procedure, but keep taking your regular medication. You only need to fast if you are having a general anaesthetic.
- ▶ You will need somebody to drive you to and from the procedure, and somebody to stay with you overnight when you get home.

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“Images of your blood vessels can help your doctor open blocked or narrow blood vessels, treat other diseases involving blood vessels, and treat tumours.”



Angiogram of the heart.

Procedure

You will be in a hospital gown and lightly sedated. A local anaesthetic to numb the skin will be used at the spot where the doctor inserts a tube (usually the groin) with a wire that is guided to the appropriate blood vessel. You won't feel the catheter inside you, as blood vessels do not have internal sensation.

Your doctor watches the threading and placement of the catheter through a type of X-ray that takes real-time pictures.

Contrast dye is injected through the catheter and into the vessel.

Multiple X-ray images are taken so doctors can identify any problems.

At times you will be asked to keep still and hold your breath. You may see the images as they come up on the screen and talk to your doctor during the examination if you wish. Once the examination is complete, the catheter will be removed and the insertion site compressed until all bleeding has stopped.

Most angiograms take about an hour, or less. More complex treatments can take longer and then you will have a general anaesthetic, as it is difficult to lie still for that long.

The procedure usually isn't painful, but might be a bit uncomfortable.



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ANGIOGRAPHY

After procedure

Nurses will watch you for up to four hours, while you rest. You will be encouraged to drink lots of fluids.

Don't lift heavy objects, have sex, or do any heavy exercise for a minimum of 24 hours. Take medications as instructed. Shower as usual, but avoid bathing for the first couple of days.

Call your doctor if you have signs of infection (including fever and chills, extreme sweating or nausea), if your leg turns white or blue or becomes numb or tingly, if the catheter insertion site becomes swollen or bleeds or if you develop chest pains or difficulty breathing. Your doctor will discuss the results with you.

Benefits

Angiography makes it possible to combine diagnosis and treatment in a single procedure, such as inserting a stent after finding severe arterial narrowing, or stopping bleeding after trauma. It may mean surgery is not needed.

“Angiography makes it possible to combine diagnosis and treatment in a single procedure.”

Limitations

Angiography and related treatments need more preparation and patient assessment than other radiology procedures.

You may need to attend a clinic before your procedure to make sure that you understand the procedure and that it will be safe for you.

There are some risk factors of this procedure for those who have allergies to medications or X-ray dye, pre-existing heart or lung conditions, those who are very overweight, have bleeding disorders, kidney disease or have had a serious recent or chronic illness.



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FLUOROSCOPY

Fluoroscopy uses X-rays and an image intensifier to produce immediate two-dimensional images, similar to a movie.

Often, a contrast dye is used to make different body parts more visible. Fluoroscopy can examine bone, as well as digestive, urinary, respiratory, and reproductive systems. It can also be used to perform minor procedures such as inserting an intravenous line.

“Fluoroscopy can be both a diagnostic and interventional procedure.”

How does it work?

An X-ray beam is passed through the body and transmitted to a monitor so its motion can be seen in detail.

Pre-test tips

- ▶ You'll probably need to fast or take a special medicine before a fluoroscopy procedure. Your doctor will let you know.
- ▶ Advise your doctor if you are allergic to contrast dye or iodine or are sensitive to medications or latex. You should also let your doctor know if you have any kidney problems.

Procedure

You may need to lie or stand, depending on what is being scanned. You may also need to hold your breath at times.

Your doctor might need you to have contrast dye through swallowing, injection or a tube already in place.

The exam will take up to 30 minutes.

Studies of the small bowel may take several hours as the bowel needs time to move the dye. In such cases, fluoroscopy is only used at the start of the study and normal X-rays used later.

faith

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After procedure

You won't need to rest for long after the procedure, and can usually eat and drink normally (it's important to keep well hydrated). Your bowel movements will be white for a day or so.

Your doctor will discuss results with you.

Benefits

This is in contrast to X-ray or CT, which shows a static image.

“Fluoroscopy shows real-time, moving images of internal organs.”

Limitations

Fluoroscopy is a relatively high dose procedure, so the X-rays are kept as short as possible. If you are pregnant, fluoroscopy is usually not advised.

Fluoroscopy shows movement well but doesn't show cross-sections of organs, like ultrasounds and CTs. Allergy to X-ray contrast dye is a small risk.



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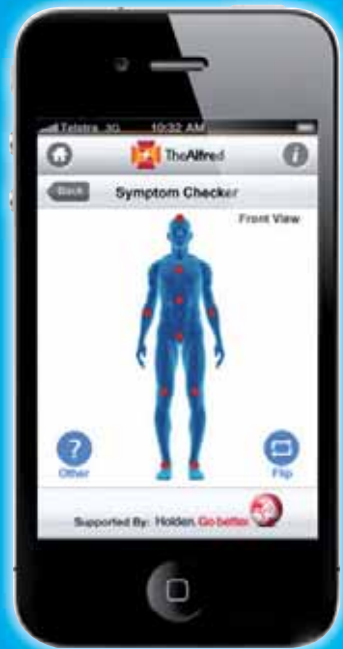
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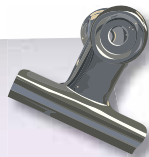


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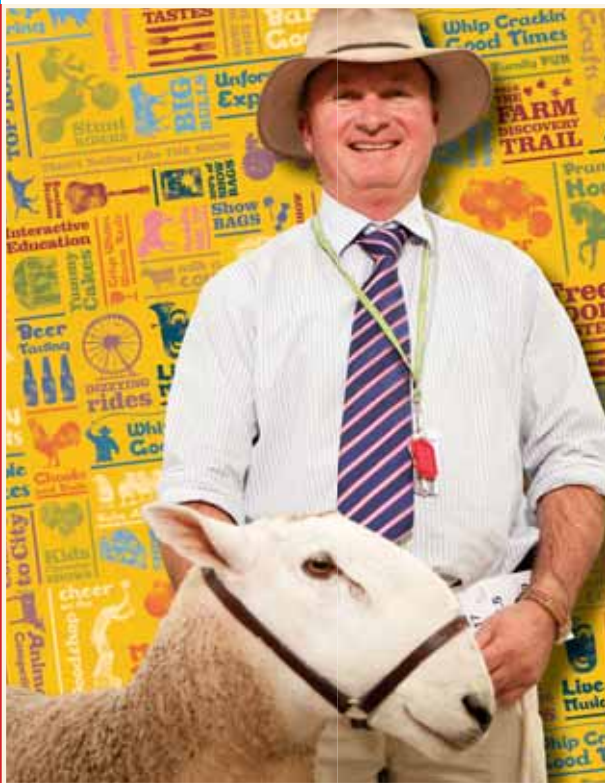


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TEST TIPS



- If you are experiencing ongoing, unexplained pain, see your GP.
- All tests need a referral. Your doctor will let you know if you require a diagnostic test.
- If you are over 50, have a faecal occult blood test (collect from chemist and do it yourself). If you have a positive result or a family history of bowel cancer, see your GP about booking a colonoscopy.
- If you are booked to have an investigative procedure, check if there are any preparations (such as fasting) required prior to the test.
- Bring a complete list of medications you are taking to inform your doctor. Also note down any allergies you have.
- Don't wear jewellery, as you have to take it off for many diagnostic scans.
- Wear loose, comfortable clothing on the day of your test.
- Organise for someone to drive you home after the test, if sedation will be given.



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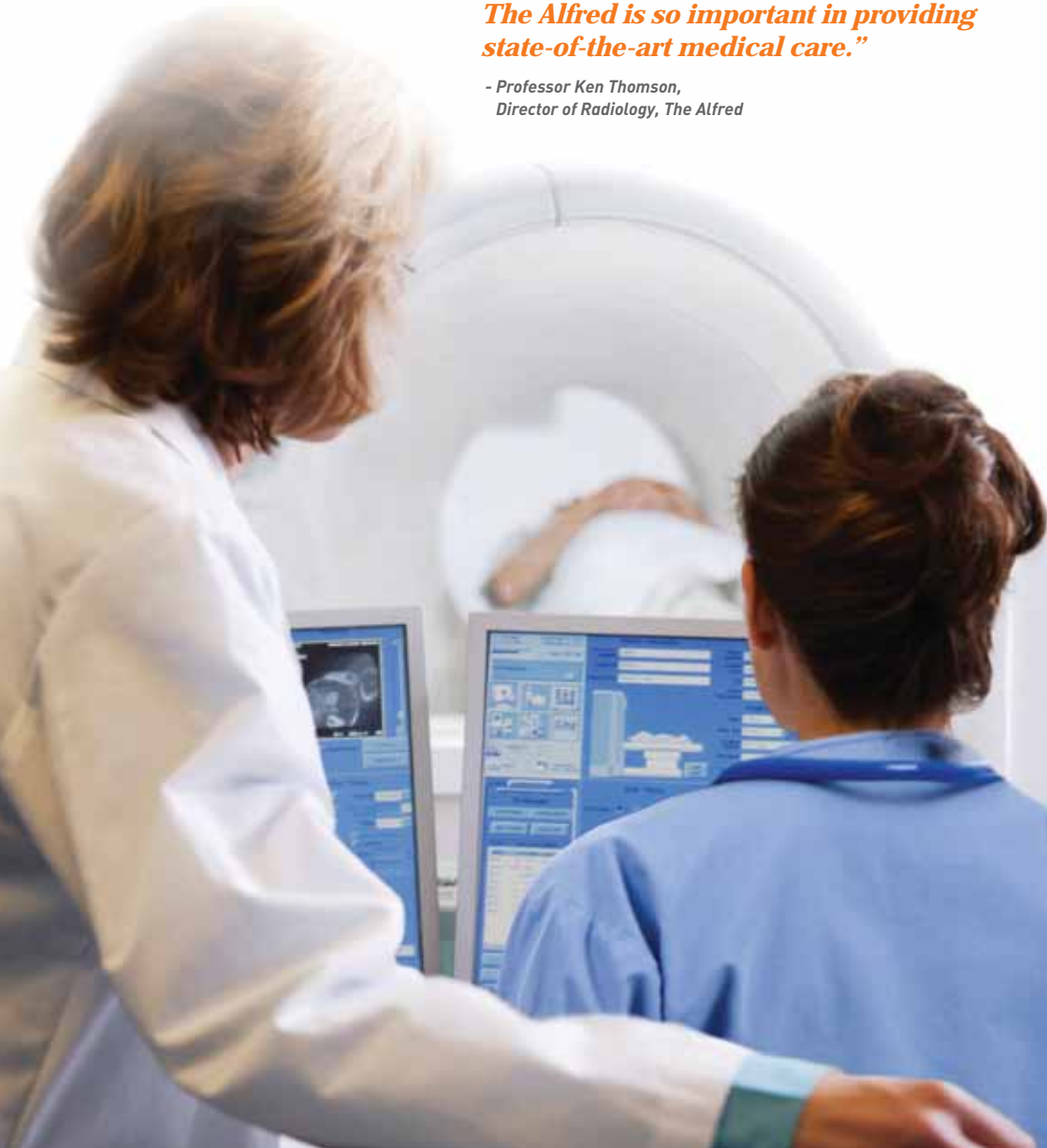
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*- Professor Ken Thomson,
Director of Radiology, The Alfred*



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