Transcatheter Aortic Valve Implantation (TAVI)

A guide for patients and families

Adventist HealthCare

Sydney Adventist Hospital is operated by Adventist HealthCare Limited.

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Adventist HealthCare originated with the opening of 'Sydney Sanitarium' in 1903 – a place of health and healing where people learned to stay well. Sydney Adventist Hospital, still fondly referred to as 'the San' has grown to become NSW's largest private hospital.

The organisation's reputation for exceptional care is built on the continuous provision of leading medical & surgical care, underpinned by the expertise, commitment and compassion of our people, and our faith-based approach to caring for the whole person – which is reflected in our Mission 'Christianity in Action – caring for the body, mind and spirit of our patients, colleagues, community and ourselves'.

Adventist HealthCare

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Transcatheter Aortic Valve Implantation (TAVI)

(Also known as Transcatheter Aortic Valve Replacment (TAVR)

AORTIC VALVE DISEASE

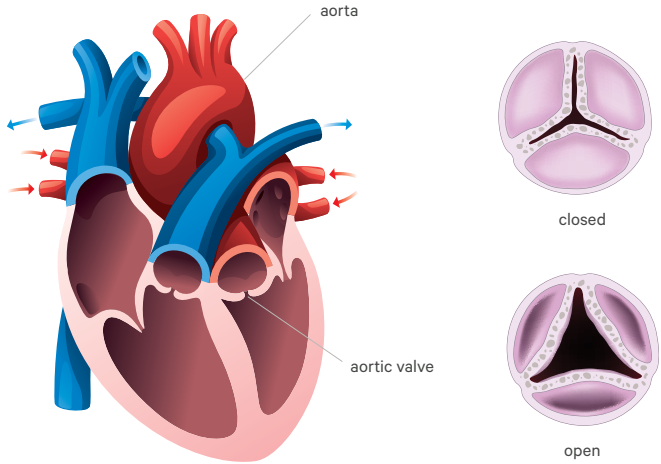
YOU HAVE BEEN DIAGNOSED WITH AORTIC VALVE DISEASE. THIS MEANS THAT THE VALVE BETWEEN THE LOWER LEFT HEART CHAMBER AND THE BODY'S MAIN ARTERY ISN'T WORKING CORRECTLY.

The aortic valve ensures good amounts of blood flow through the heart in the right direction. The aortic valve can be damaged and fail to close correctly, allowing blood to flow back up into the atria (aortic regurgitation), or become hardened and prevent adequate amounts of blood flowing through the valve (aortic stenosis).

Both conditions prevent enough blood being pumped out of your heart and around your body, resulting in an increased workload for your heart. This can result in breathlessness, swollen ankles, chest pain, dizziness, and sometimes blackouts or fainting episodes.

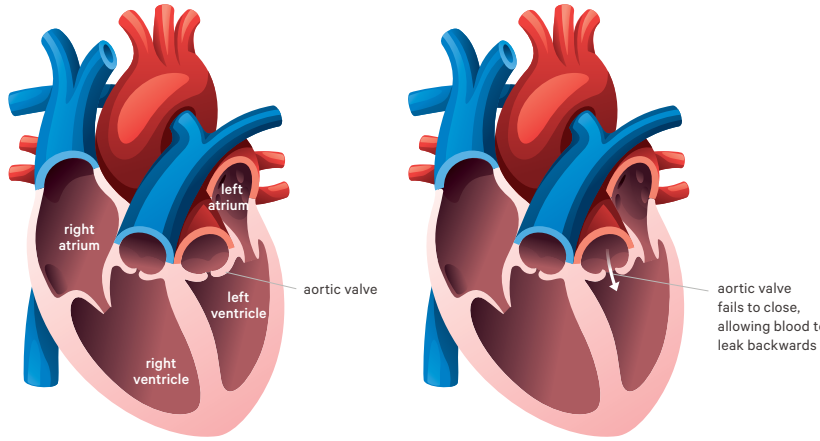
Aortic valve disease includes:

1. **Aortic valve stenosis.** Each heart valve has flaps of tissue that open and close once per heartbeat. The flaps also are called cusps. Sometimes the aortic valve flaps become thick and stiff, or they connect together. This causes the valve opening to become narrow. The narrowed valve reduces or blocks blood flow from the heart to the rest of the body.



Bicuspid Aortic valve disease = two cusps (or flaps) are diseased or damaged
Tricuspid Aortic valve disease = three cusps (or flaps) are diseased or damaged.

2. **Aortic valve regurgitation.** The aortic valve fails to close properly, causing blood to flow backward into the left lower heart chamber.



typical heart

aortic valve regurgitation

3. **Congenital aortic valve disease.** A person may be born with aortic valve disease. This is called a congenital heart defect.

   Treatment for aortic valve disease depends on the type and severity of disease. For some people open heart surgery to repair or replace the aortic valve is the most appropriate, while for others a non-surgical approach is best option. Your doctors have recommended the non-surgical aortic valve replacement called a Transcatheter Aortic Valve Implant (TAVI) to treat your aortic valve disease. The TAVI procedure for implanting aortic valves through a catheter is less invasive, resulting in both a reduced hospital stay and recovery time..

The purpose of this guide is to help you and your family prepare for your TAVI procedure and your inpatient stay at Sydney Adventist Hospital and for your recovery at home.

Prior to the TAVI procedure

Before coming in to hospital you will have already had a series of investigations, tests and seen your cardiologist. When your cardiologist recommends you for a new aortic valve, your medical case will be presented at a Multidisciplinary Team (MDT) meeting including several doctors, nurses, technicians and other medical staff. At this meeting your case will be looked at individually and a decision will be made as to which is the best option for treating your aortic valve disease. You will be recomended for either open heart surgery or for the TAVI procedure.

Although the TAVI team will make the most appropriate recommendation, the final decision will be made jointly between you and your doctor. Before making your decision, make sure your questions are answered and that you understand your options.

TAVI is a complex procedure performed by cardiologists and cardiac surgeons who have specifically been trained in cardiac valve replacements. Therefore you may be under the care of a different team of cardiac doctors whilst you are at the San having the TAVI but will be referred back to your usual cardiologist after the procedure.

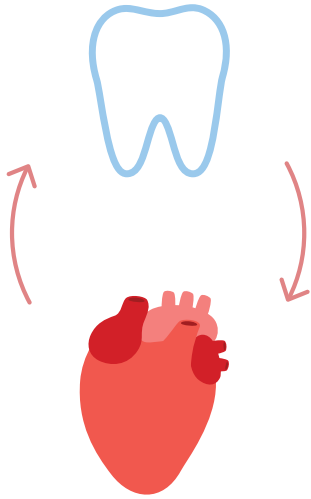
The medical team involved in your TAVI procedure will be a mix of expertly trained specialist cardiologists, cardiac surgeons, anaesthetists, nurses, technicians and radiographers. Many will

be in the Cardiac Catheter Lab (CCL) with you while some will be viewing and assisting from an external room.

At the San we have a TAVI coordinator who is a specialist cardiac nurse, and they will assist in organising your TAVI, will visit you in hospital and follow up with you after your procedure.

DENTAL CHECK

When assessing you for the TAVI your doctor may have recommended a dental check. This is important because dental infection can travel to your new valve, causing a serious infection and damage the valve. This can also lead to a serious, potentially deadly, heart infection. If you have any concerns about dental issues, please contact your dentist prior to having this procedure and discuss with your cardiologist.



Admission to hospital prior to the procedure

In most cases you will be admitted to the Coronary Care Unit (CCU) the day before your procedure. Sometimes patients are admitted the day of the procedure. The CCU is a high dependency cardiac unit staffed by specialist cardiac trained nurses. You may be admitted the day before the procedure to ensure that all necessary tests and investigations have been completed. You will also be seen by several people including the TAVI coordinator, your anaesthetist and a physiotherapist.

BEFORE THE PROCEDURE

- You will need to fast (not have anything to eat or drink) for at least 4-6 hours prior to the procedure. Your nurse will inform you when you must start fasting from
- You will need an ECG (heart rhythm tracing)
- You will need some more blood tests
- You may need a Chest X-ray
- You may need an ultrasound of your heart (echo)
- You will need a spirometry test (breathing test)
- You will need a urine test (to rule out existing infection)
- You will need to have swabs taken from your nose and groin. This is to minimise the risk of infection following the procedure.

- You will need to be shaved around both groin areas for femoral blood vessel access. Sometimes doctors request a more comprehensive shave.
- Your nurse will record your height and weight (to assist in calculating medication and anesthetic doses and fluid accumulation during and after the procedure).
- You will need to have a cannula (small tube) inserted in your arm for medications and for a fluid drip during and after the procedure.
- You may be given some blood thinning medications if not already on them (to reduce the risk of blood clots).
- You will be asked not to take some medications particularly diabetic medications to avoid complications. Your nurse will advise you on this.

Transcatheter Aortic Valve Implantation (TAVI) procedure

The TAVI procedure will take place in the Cardiac Catheter Laboratory (CCL) next to the Coronary Care Unit (CCU) . It will take between 1 to 3 hours.

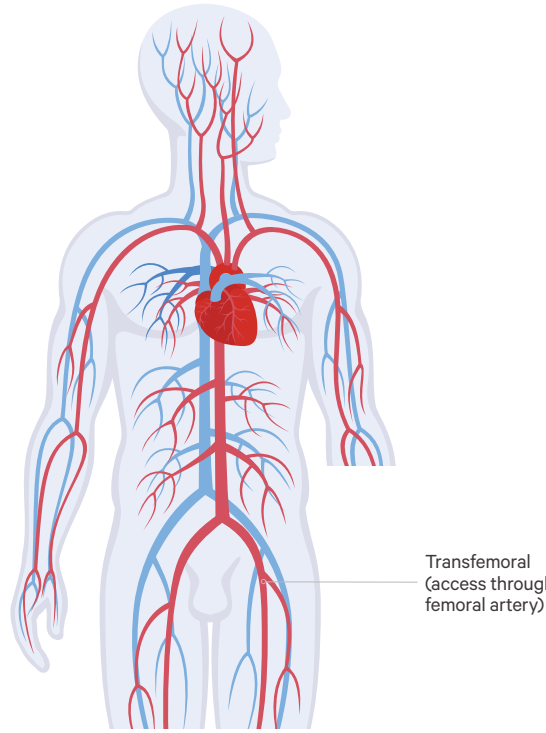
THE ANAESTHETIC

You will be given sedation or a general anaesthetic. This will be decided by your anaesthetist in consultation with your cardiologist. If you are having sedation only, the anaesthetist will use a type of medication that helps you relax and feel sleepy. You will also have a local anaesthetic medication injected into your groin areas, so you do not feel any pain when the catheters are inserted into your blood vessels.

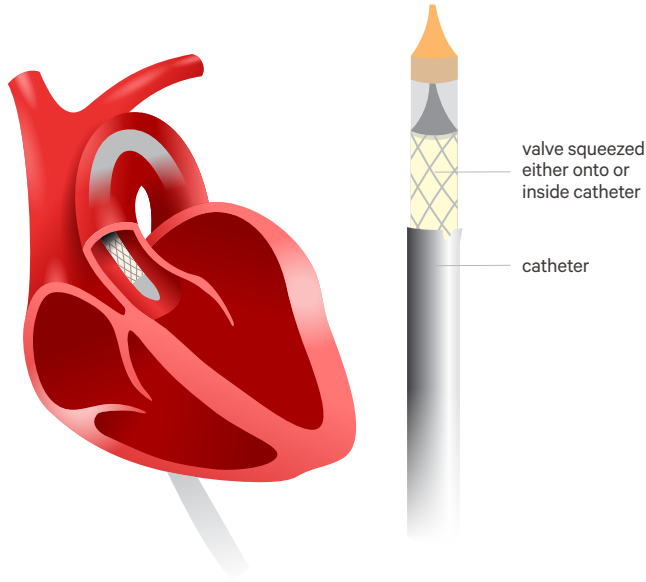
If your doctors decide you require a general anaesthetic, you will receive medication that puts you completely to sleep. Once you are asleep your doctor will place a breathing tube in your mouth and throat. This helps monitor your breathing and oxygen levels during the procedure. Once you are awake the anaesthetist will remove the breathing tube. It is very normal to have a dry, scratchy throat after a general anaesthetic due to the breathing tube. Please inform your nurse if you are uncomfortable as you can be given some throat soothing medication.

THE TAVI PROCEDURE

At the start of the procedure your doctor inserts a small catheter sheath into a large blood vessel called the femoral artery in your groin.



A thin catheter holding the new aortic valve in or around its tip, is then threaded through the sheath that is already in your groin, into your blood vessel and guided up into your heart.

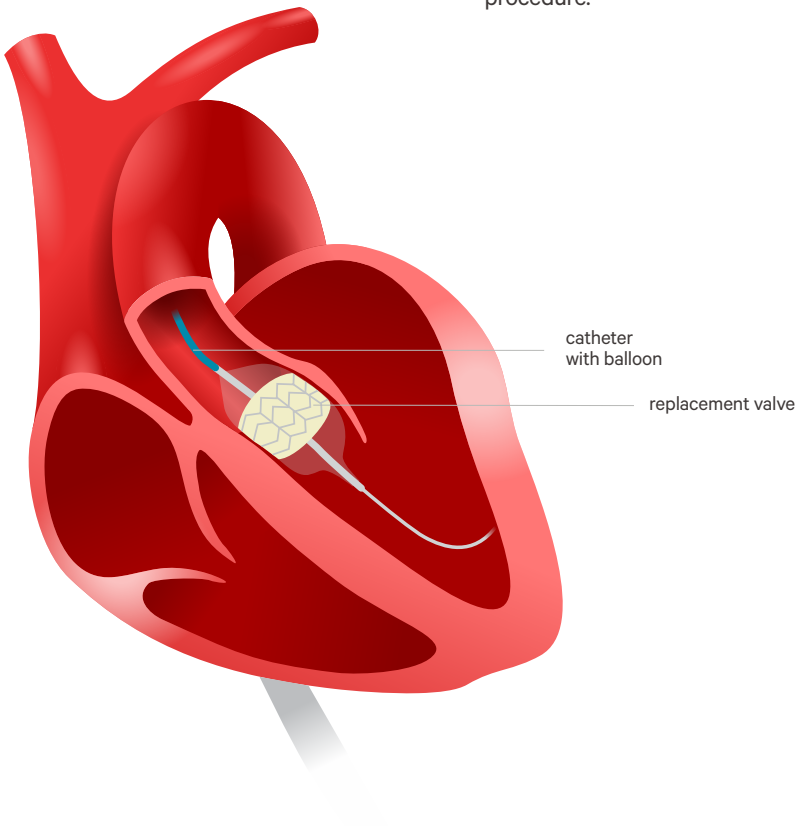


Using ultrasound and X-ray guidance the new valve encased in a metal frame (stent) will be placed in your existing diseased valve. The new valve will be deployed (opened), expanding and pressing it into place. The new valve is made of natural tissue from the heart of either a cow or a pig. The metal frame stays in place in your valve and your natural tissues will grow over and incorporate the frame over time.

Once the valve has been tested and is working correctly the catheter will be removed from the heart and the sheath will be removed your groin area.

This picture below shows the valve being positioned and deployed (or opended) using an inflated balloon on the end of the catheter. Some valves are self expanding once inserted and don't require balloon inflation.

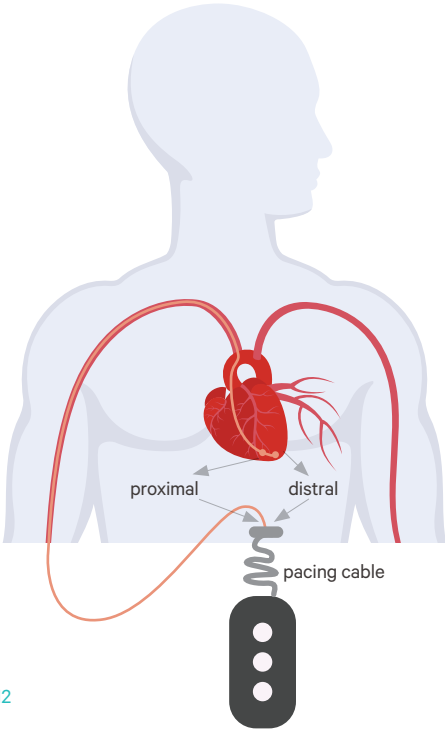
Once the valve is in place you shouldn't feel it, but some patients might feel mild chest discomfort for a day or two after the procedure.



PACING WIRE

Many patients will also have a pacing wire inserted into the femoral artery in their groin during the procedure. This wire will be fed up to the right side of the heart. It is used to test the new valve once is has been positioned, by making the heart beat fast and assessing the valve function and blood flow during the fast heartbeat.

This wire is often removed at the end of the procedure, however some patients will need the wire to be left in place for up to a day after the procedure, especially if you have a slow heartbeat. Sometimes the new valve can damage the electrical conducting system of the heart when it is positioned, or inflammation can occur around the valve site that interferes with the normal electrical activity of the heart.



This usually causes a very slow heart rate and can be temporary or permanent. If your heartbeat is not back to normal the day after your TAVI you may require a permanent pacemaker to be fitted. Sometimes your doctor can predict the complication of a slow heart rate and may request a permanent pacemaker be fitted before the TAVI procedure.

If you already have a permanent pacemaker, you will not require a pacing wire during the procedure.

AFTER THE PROCEDURE

After your procedure you will return to the CCU and stay a minimum of one night being closely observed and on a cardiac monitor. If you are stable but need to stay longer than 2 nights, you will be transferred to the general cardiac ward.

On return to the CCU, you will be very sleepy and need to remain calm, quiet and still. We recommend only 1 visitor for the remainder of the day as you will need to rest. After the procedure the following will apply:

- You will have an oxygen mask on your face until you are fully awake and your monitored oxygen levels have returned to your normal level. The oxygen level is measured by the clip on your finger.
- You will be attached to a cardiac monitor which the nurses can view and monitor remotely.
- You will be attached to a drip providing you with fluids until you are able to drink normally.

- If you return to the CCU with a **pacing wire** still in place, you must remain resting in bed until this is removed. This wire is supporting your heart and is a backup in the event that your heartbeat slows down suddenly. It is very important that you remain flat and still to ensure the wire does not become dislodged. The nurses will closely monitor and assist you.
- You will return to the unit with an **arterial line** secured in your arm. This line monitors your blood pressure very accurately and you must be careful not to pull it or knock it as it can cause extensive bleeding if it comes dislodged. Once you are stable the line will be removed.
- Some patients will require a blood transfusion, in addition to intravenous fluids, via the drip in your arm.
- You will need to lie flat for at least 4-6 hours after returning to the CCU (longer if you have a pacing wire) until your condition is stable. Stable means a normal heart rate, blood pressure, oxygen level and no bleeding from your groin areas. If there is any bleeding from your groin sites, you will need to keep lying flat in bed. This is to prevent further bleeding and complications and also to prevent a drop in blood pressure caused by bleeding.
- Providing you don't have a pacing wire you will be able to mobilise to the bathroom and sit out of bed once your condition and groin wound site has stabilised.
- If your condition is unstable and you are not able to mobilise but need to go to the toilet the nurses will assist you in using a urine bottle or bed pan. In some cases, you may have a urinary catheter in place.
- If you have had a general anesthetic, you may feel nauseous from the anesthetic. You may also have mild discomfort from your groin wound site or mild chest discomfort. Whilst these are expected, you must inform your nurse who can provide you with medications for nausea and pain.
- You will be able to eat once you are fully awake and feel like eating.

Discharge

Your cardiologist will visit you the evening of the procedure or the morning after and explain the results to you.

You will need a cardiac ultrasound (echo) prior to being cleared for discharge to ensure the valve is correctly in place and functioning as expected.

Your cardiac nurse will discuss discharge with you and give you a patient discharge information sheet and a phone number to call if you are concerned in the first few days you get home.

You must see the **ward pharmacist** who will check your medications and explain any new medications to you.

Please ensure someone is with you for at least 2 days after discharge.

When you leave hospital your body will need time to recover. Please follow all the instructions given to you by the nurses and your doctor. Some people see results immediately after their TAVI procedure, but in most cases, it will take around 6 to 10 weeks before you have fully recovered and feel the benefits of the procedure.

In some cases patients need additional clinical care and support during recovery, and inpatient rehabilitation at the San may be an option. The San also has an excellent cardiac rehab program which may also be suitable. Please discuss these with your cardiologist or the cardiac patient educator.

You should have a follow up appointment already booked with your Cardiologist. If not, please ring their rooms and make an appointment. You should also make an appointment to see your GP one week after discharge for a general check.

Do not stop taking any medications unless you have been advised by a doctor. You will be at risk of stroke or heart problems if you stop some medications.

Potential risks and complications of the TAVI procedure

It is very important that you and your next of kin understand why you are having your particular procedure and any potential risks involved. Your specialist will outline both the benefits and risks of having a TAVI procedure.

Please ask questions and ensure you understand. Once you agree to the procedure, you will need to read and sign the consent form. Please talk to your doctor, the TAVI co-ordinator or your nurse once you are admitted if you have any questions or concerns.

Most patients do very well after TAVI but occasionally, as with any procedure, complications can occur. Some of the rare complications that can occur are:

1. **Bleeding or clotting.** The most common risk of the procedure is bleeding from the groin sites. Whilst some minimal bleeding is expected, excessive bleeding or a haematoma (bleeding under the skin causing a painful lump to form) can also occur. This can happen due to damage of the blood vessel when the catheter is inserted, or because your blood is thin due to necessary blood thining medications given prior or during the procedure. Blood clotting in your leg blood vessels can occur in rare instances. If there is any concern about bleeding or blood clotting a vascular doctor will be consulted.

   You can reduce the risk of groin site complications occuring by lying flat and still as instructed after the procedure and mobilising with nurse assistance.

2. **Heart rhythm problems.** These can occur due to inflamation or damage to the conduction system during the procedure. If your doctor is concerned they will leave the pacing wire used during your TAVI to support your heart beat in place for a while after the procedure to see if your heart recovers its normal heart beat. If your heart beat remains slow you may

need to have a permanent pacemaker fitted. Between 10-20% of patients will need a permanent pacemaker after a TAVI.

3. **Kidney problems.** During the TAVI procedure, a special dye is injected into your bloodstream to make your aortic valve and blood vessels show up under X-ray. This dye can cause kidney irritation in some people. Your kidney function will have been checked in the admission blood teats and if you already have kidney issues, your doctors will be aware and will be mindful of the amount of dye used. In very rare cases a patient can require temporary or permanent kidney dialysis. If required a renal specialist will be consulted.

4. **Stroke.** During the TAVI procedure, there is a rare chance that some of the calcified plaques that have built up around your aortic valve may break away and become lodged in small arteries in your brain. This may lead to stroke. Precautions are taken to prevent this including administering blood thinners to prevent blood clots causing stroke and, in some cases, using a special embolic protection device (a guard or net) to collect any plaques or debris that breaks off from the valve. If there is any concern a neurologist will be consulted.

5. **Heart attack.** In rare cases during a TAVI a blood vessel in the heart can become blocked and a heart attack can occur. Our specialist doctors will treat this immediately if it occurs.

6. **Endocarditis.** An infection around the lining of the heart that can occur after any cardiac intervention. This causes inflammation around the heart and can become serious if not treated. It is usually treated with antibiotics.

7. **Tear of the aortic wall.** When deploying (opening) the valves a small tear in the aortic vessel tissue can occur. In this case the procedure will proceed directly to theatre and become open heart surgery.

8. **Dislodgement of the valve after implantation.** If the valve becomes dislodged during the procedure it may be repositioned at the time. If it becomes dislodged later which is very rare, it may require a return to the cath lab for another procedure.

9. **In very rare cases death can occur.** A TAVI is a complex procedure with very rare but possible life threatening complications. If there are any concerns during the procedure or after, you will be transferred to the intensive care unit for closer observation. In some rare cases if complications occur such as a tear in the aortic wall whilst attaching the valve, the procedure has to proceed directly to open heart surgery in theatre. Emergency surgery carries a greater risk of death and other complications. As such, it is very important you and your family discuss what life prolonging interventions you would want in this case. You will be asked at the time of signing your consent whether you wish to have emergency surgery in the event of life-threatening complications. This will help your doctors decide how to proceed if this rare situation is to occur.

If there is anything that you wish to discuss further, please talk to your primary nurse in the CCU, the TAVI co-ordinator or your specialist.

Sydney Adventist Hospital

IMPORTANT CONTACT NUMBERS

SYDNEY ADVENTIST HOSPITAL	(02) 9480 9111
PATIENT SERVICES – ADMISSIONS, ESTIMATES AND ONLINE ENQUIRIES	(02) 9480 9903
CORONARY CARE UNIT (CCU)	(02) 9480 9677
CARDIAC CATHERTER LABORATORY (CCL)	(02) 9480 9130
INTENSIVE CARE UNIT (ICU)	(02) 9480 4760
EMERGENCY CARE	(02) 9480 9171
PATIENT ACCOUNTS	(02) 9480 9900
JACARANDA LODGE (ONSITE, LOW COST ACCOMMODATION)	(02) 9480 9066
ANY AFTER HOURS ENQUIRIES	(02) 9480 9111

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Partner in nursing education Avondale University
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