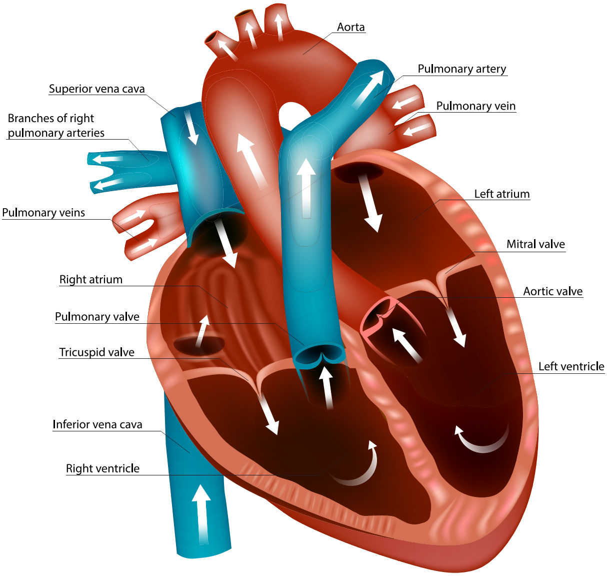
National University
Heart Centre
Singapore

Paediatric Cardiac Surgery

Meet the Congenital Heart Surgery Team

At the National University Heart Centre, Singapore (NUHCS), we pride ourselves in providing exceptional care for highly complex congenital heart surgery needs. Our team of surgeons include A/Prof Kiraly Laszlo (pictured centre), Head of the Division of Congenital Heart Surgery and Senior Consultant, Dr Winn Maung Maung Aye (pictured right), Consultant, and Dr Senthil Kumar Subbian (pictured left), Consultant, Department of Cardiac, Thoracic & Vascular Surgery (CTVS), NUHCS.

How does a normal heart work?



The normal heart has four chambers. Blood circulates throughout the body and returns to the heart in the right upper chamber (right atrium). It passes through the tricuspid valve to the right lower chamber (ventricle). Then, through the pulmonary valve and artery to the lungs for oxygen. Blood will return to the left upper chamber (left atrium) through the pulmonary veins. It will pass through the mitral valve to the left lower chamber (ventricle) and get pumped out of the aortic valve to the aorta, to supply the body with oxygenated blood.

Congenital Heart Defects

A congenital heart defect is a malformation of the heart existing at birth. Congenital heart defects change the normal flow of blood through the heart. There are many types of congenital heart defects. They range from simple defects with no symptoms to complex defects with severe and life-threatening symptoms, which need to be surgically rectified. Sometimes, it is necessary to repair the defect in stages. It may involve putting in a temporary shunt to redirect the blood flow so that your child can grow bigger and stronger before carrying out a definitive procedure.

Types of Congenital Heart Surgeries

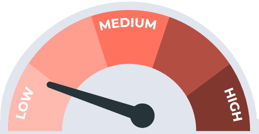
Heart defects that are fixed during surgery are grouped into two categories:

a) Open heart surgery

The heart needs to be opened for surgery and therefore the cardiopulmonary bypass (heart-lung) machine is used to oxygenate and circulate the blood.

b) Closed heart surgery

The heart is not opened and cardiopulmonary bypass machine is not used.



The benefits of undergoing surgery outweigh the risks of foregoing surgery. The major risks of disease continuation include fatality, neurological abnormality, arrhythmia, renal dysfunction, bleeding and infection. The surgeon will discuss with you the possible risks and benefits of surgery.

What happens before surgery?

Prior to the scheduled surgery, a Congenital Heart Surgery Care Coordinator will contact you regarding the confirmation of your child's surgery and the time of admission to the General Paediatric Ward (Ward 45 or 47 or 9B).

Admission to General Ward

Parents will be advised to come together with your child to the assigned ward before 3pm, a day before the scheduled surgery date.

Your child will be seen by various doctors – namely the Congenital Heart Surgery Team, Paediatric Team and Anaesthesia team – and will undergo the following:

Measurement of height and weight:

- This is to calculate appropriate medication doses for your child.

Observations of:

- Vital signs including temperature, heart rate, respiration rate, blood pressure, oxygen saturation, etc.

Blood tests and insertion of Intravenous Cannula:

- To check your child's blood components and blood type.
- To administer fluids when your child is kept fasted prior to surgery.

Preparation:

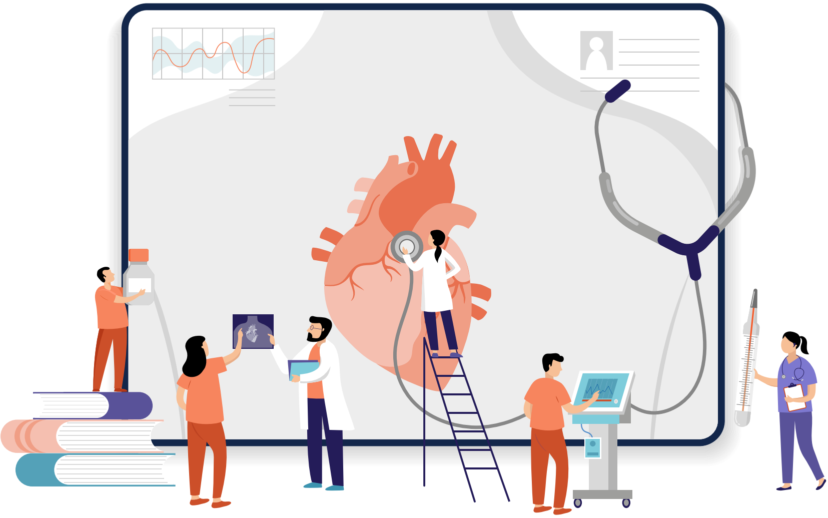
- Antiseptic/antimicrobial wash will be used during shower before surgery.

Chest X-Ray:

- To check your child's heart and lungs before surgery.

Electrocardiogram (ECG):

- Sensors will be attached to the skin to check the heart rhythm and electrical activity.



Doctors will review the test results prior to surgery to ensure that all test results are within normal limits. Further arrangements will be done if the test results are atypical.

Assessment by Different Medical Teams:

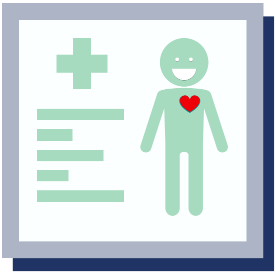
Congenital Heart Surgery Team:

- The Congenital Heart Surgery Team will take consent from parents for the surgical procedure.

- If you have any questions regarding the surgery or after-surgery process, please feel free to approach the surgical team.

Paediatric Team:

- A Paediatrician will do a full medical assessment and a thorough history-taking of your child by asking you various questions, such as your child's allergies and vaccination status. Do bring along your child's health booklet.



Anaesthetist Review:

- An Anaesthetist will review and speak to you regarding:

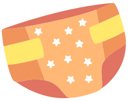
- Management of your child during surgery.

- Examination of the general dental status, to ensure that your child does not have loose teeth that can dislodge when a breathing tube is inserted via the mouth into the airway.

- Fasting period prior to surgery.

Items you may want to bring during your child’s stay in the hospital

- Formula milk / expressed breast milk
- Milk bottles
- Pacifier
- Mittens
- Socks
- Diapers
- Diaper cream
- Moisturisers
- Wet wipes
- Toy



One parent will
be allowed to stay
overnight with the child
in the ward before the
surgery.

What happens during the surgery?

On the day of surgery, your child will be brought to the operating theatre.

Both parents will be allowed to accompany your child to the operating theatre reception.

One parent will be allowed to accompany your child into the operating theatre but will have to leave after the start of anaesthesia.

The Anaesthetist will provide some sedation for your child to fall asleep, in preparation for surgery.

One of the operating theatre staff will contact you once the operation is completed.

What happens after surgery?

Paediatric Intensive Care Unit (PICU)

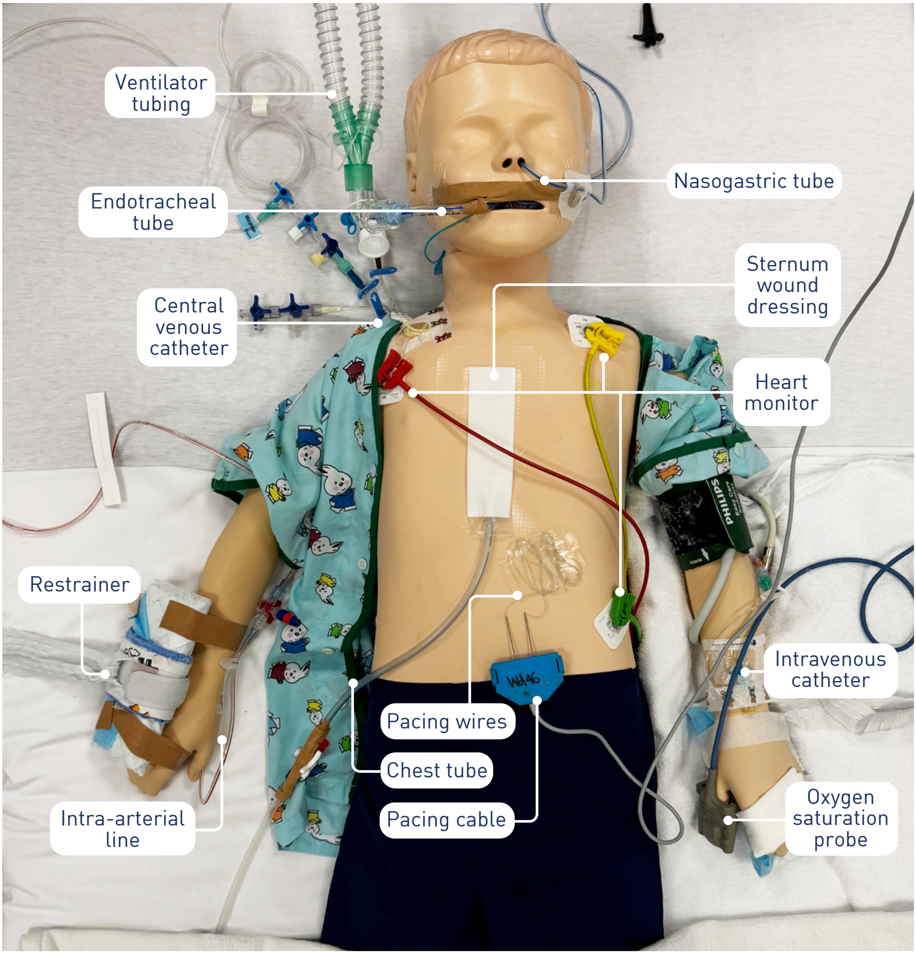
Upon arrival at the PICU, you will be oriented around the ward by a Patient Service Associate to familiarise with the environment. The doctors, nurses and therapists will monitor your child closely to provide the utmost care. You may need to wait outside the ward upon arrival at the PICU as your child needs to be stabilised after returning from the operating theatre.

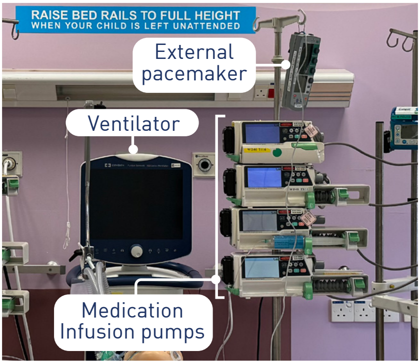
Please wash your hands or use the antiseptic handrub, which is placed around the ward, before and after visiting your child.

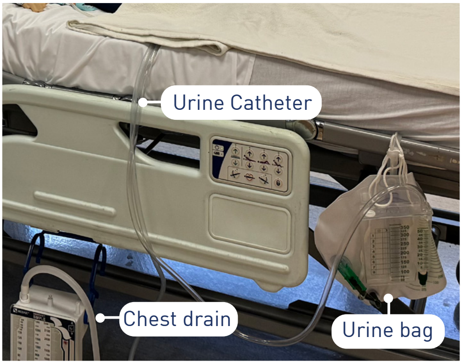
Parents/caregivers can visit their child in the ward at any time. No more than two people are allowed to be at the bedside at any one time.

While your child is in the PICU, your doctor may refer you to the Ronald McDonald House (RMH) or the Ronald McDonald Family Room (RMFR) which provides a place of respite while allowing you to be steps away from your hospitalised child at no cost.

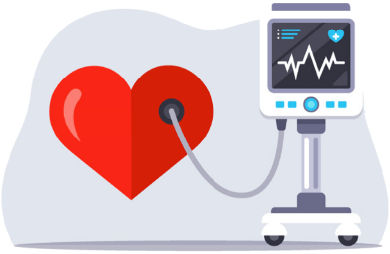
Alternatively, you may choose to return home while your child is sedated. Your health is also important during your child's recovery process; it is crucial that you receive adequate rest so that you can be there for your child when he/she is awake. Our doctors and nurses will keep you updated, and you are welcome to return to the ward at any time.


Ventilator tubing
Nasogastric tube
Endotracheal tube
Sternum wound dressing
Central venous catheter
Heart monitor
Restrainer
Intravenous catheter
Pacing wires
Chest tube
Intra-arterial line
Pacing cable
Oxygen saturation probe


RAISE BED RAILS TO FULL HEIGHT
WHEN YOUR CHILD IS LEFT UNATTENDED
External pacemaker
Ventilator
Medication Infusion pumps


Urine Catheter
Chest drain
Urine bag

Monitoring and equipment



Monitors

- Your child will have stickers and leads attached to them, this is to monitor body functions such as blood pressure, oxygenation level, heart rate, etc.

Ventilator

- Your child will be on a breathing tube via the nose or mouth, connected to a ventilator to support their breathing. To prevent the tube from being blocked, the nurse will regularly pass another small catheter through the ventilator tube to clear the mucus by suctioning. Chest physiotherapy will also be done to aid in relieving the mucus.

Hand splints and restrainers

- Used to keep the hand straight and prevent your child from accidentally pulling or dislodging tubes and lines, an action which could be detrimental to your child's treatment process.

Nasogastric tube

- A tube which is passed through the nostril, down the back of the throat into the stomach. This is to drain stomach fluids and gas to prevent bloating and reduce the chance of vomiting. Medications and milk will also be fed through the tube, and it will be removed once your child is strong enough to feed orally.

Intra-arterial line

- A cannula will be inserted in the artery (either from the wrist or groin) for blood pressure monitoring and taking of blood samples for various blood tests to monitor your child's progress.

Central Venous Catheter (CVC)

- An intravenous cannula/line inserted into the large vein on one side of the neck or groin, to aid in administering fluids and medications through it. Blood samples will also be taken for certain blood tests.

Chest drains

- During surgery, chest drain(s) will be inserted to drain any blood, fluid or air from the chest cavity. They will also be connected to a container which will gently pull the fluids out. The chest drains will be removed within several days or weeks when appropriate.

Pacing wires

- Many children will have pacing wires inserted during open-heart surgery. The beating of the heart may be interrupted or slowed down after surgery, and your child will be attached to an external pacemaker, if affected.

- This is to keep the heart beat at the normal rhythm until the heart recovers.

Peritoneal drain

- Some children may have reduced kidney function after cardiac surgery. A tube will be inserted into the abdomen to drain unwanted fluids that are collected there.

Urine catheter

- A catheter will be inserted to drain and accurately measure urine output for monitoring of fluid status.

Chest X-Ray

- There will be regular chest x-rays to check the condition of the heart and lungs.

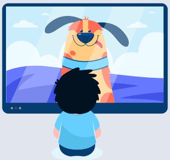
Electrocardiogram (ECG)

- Sensors will be attached to the skin to check the heart’s rhythm and electrical activity.

Medications

- Your child will be on continuous infusions that include sedatives and pain relief medication, as well as those that support the heart and blood pressure.
- These medications will gradually be weaned off as your child's condition improves.

There are also other ways of pain relief: Distracting your child with their favourite TV shows or by playing their favourite music. Holding a folded towel to their chest helps with the discomfort when they cough.



Physiotheraphy

- After undergoing heart surgery and anaesthesia, it is common for children to have increased phlegm in their lungs.
- They may be less active than usual, and unable to cough effectively to clear their phlegm, thus often requiring physiotherapy to prevent and reduce the risk of lung infection.

A Physiotherapist will also review your child after heart surgery:

- For infants: developmental screening and education on various kinds of exercises you can do for your child.
- For toddlers and above: assist in sitting out of bed and going for a walk. Support will be provided for children with mobility issues or chest concerns.

Wound care

- During surgery, the surgeons will use dissolvable stitches to close up the chest wound.

- However, there may be visible stitches on the surface of the skin where the chest drains were placed and these will be removed 10-14 days after surgery in conjunction with your child's follow-up appointment in the clinic.

What happens in the General Ward?

- Once your child is assessed to be stable, he/she may be transferred to the general ward or could possibly be discharged home from the PICU or High Dependency Unit (HDU).
- Please wash your hands or use the antiseptic handrub, which are placed around the wards, before and after visiting your child.

Information for General Ward visits

- Parents/caregivers can visit their child at any time. No more than two people are allowed to be at the bedside at any one time.

Monitoring and equipment

- Your child's basic vital signs will still be monitored with equipment in the General Ward.
- If your child still has chest tube(s), it will be removed by the surgeon once it is safe to do so.

Medications

- Your child will be given oral medications.

Wound care

- Chest wound dressing may be changed by the nurse and you will be taught about wound care prior to discharge.
- The wound will be covered with a dressing to keep it clean and dry.
- You will need to **keep the wound clean and dry for 2-3 weeks**.
- You may cover the wound area with a waterproof dressing during shower or bath time.
- You will be taught how to do simple dressing for your child prior to discharge.

Physiotherapy

- A Physiotherapist may review your child again, depending on his/her progress.

Discharge

- A scheduled follow-up appointment to see your Cardiologist and Cardiac Surgeon will be sent to you via text.
- Adequate amount of prescribed medications will be given to your child and this should be sufficient to last until the next appointment.
- The wound will be lightly dressed upon discharge.

Self-Recovery at Home

Feeding:
- Follow as per regime/advice given prior to discharge.

Medications:
- Follow as per what the Pharmacist had counselled you prior to discharge.
- If you require any medication top-up, you can contact the Congenital Heart Surgery Care Coordinator who will inform the surgical team.

Handling:
- If your child underwent open chest surgery, try NOT to lift the child via the armpits. Instead, lift the child from his/her back gently.
- Bathe your child everyday and remove the light dressing as advised by the nurses before bathing. While bathing, do not soak your child in a tub of water as the wound may not be fully healed yet. Instead, gently bathe your child with a showerhead.
- After bathing, dry gently, especially the wound, using a dry clean towel.
- Re-apply the light dressing to the wound as instructed prior to discharge.

Follow-up Clinic Visit

- You will be notified to see your Congenital Heart Surgeon and Cardiologist at scheduled times for review after discharge from the hospital.
- Please feel free to update the doctors on your child's recovery progress at home from when last discharged from the hospital.

What to expect when my child goes back to school?

Your child will be fit to go back to school 8 - 12 weeks after surgery.

The doctor can issue a memo for the following:

1. Exercise from Physical Education (PE)
2. Pass to use the school lifts
3. No carrying of heavy bags

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Ronald McDonald House (RMH) at NUH

The Ronald McDonald House (RMH) at NUH is a special home-away-from-home for families of seriously-ill children being treated at NUH. We know parents want to be close to their children while they are hospitalised, and the RMH offers a home-like environment where parents can find respite from the anxiety and stress of the wards. The doctors, nurses and hospital staff are here to take good care of your child and the RMH is here to help take care of you.

Log on to: www.rmhc.sg

Call: (65) 6778 1934

Visit: NUH Main Building Level 4

National University Heart Centre, Singapore (NUHCS)

Scan for
more information

- NUHCS at National University Hospital (NUH), Kent Ridge - Main Operations
  Main Building Zone F
  Operating Hours: 8:00am - 5:30pm (Monday - Friday)
  Closed on Weekends & Public Holidays

- NUHCS Heart Clinic @ Ng Teng Fong General Hospital (NTFGH)
  Tower A - Specialist Outpatient Clinics Level 3, Clinic A34
  Operating Hours: 8:00am - 5:30pm (Monday - Friday)
  8:30am - 12:30pm (Saturday)
  Closed on Sundays & Public Holidays

- NUHCS Heart Clinic @ Alexandra Hospital (AH)
  Operating Hours: 8:30 am - 5:30 pm (Monday - Friday)
  Closed on Weekends & Public Holidays

- NUHCS Heart Clinic @ Jurong Medical Centre (JMC)
  Operating Hours: 8:30 am - 5:30 pm (Monday - Friday)
  Closed on Weekends & Public Holidays

NUHS Hotline: (65) 6908 2222
NUHS Appointments: appointment@nuhs.edu.sg
NUHS General Enquiries: contactus@nuhs.edu.sg
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Information is correct at time of printing (Jul 2024) and subject to revision without prior notice.