

# **AST PROGRAMME**

## **PAEDIATRIC CARDIOLOGY**

### **(A) INTRODUCTION**

#### **Definition**

Paediatric subspecialization is important with the rapid increase in knowledge, not only in evidence-based medicine, but also in understanding of the molecular pathogenesis of diseases. In tandem with other specialties in medicine, paediatrics is itself being increasingly sub-specialized with developments in various branches, allowing in-depth study into the treatment of various systems, yet preserving an oversight of the child and his/her family as a whole. Advances in paediatric cardiovascular medicine have been tremendous over the past few decades. Of note, when only the simplest cardiac surgery had been attempted some 50 years ago, now, the sophistication with which complex congenital heart defects can be surgically managed is a reality. Whilst the age at which surgery can be offered has decreased, the outcomes have improved. Indeed, neonatal cardiac surgery under cardiopulmonary bypass is now commonplace. Concomitantly, other areas of paediatric cardiology have been similarly developed. Interventional catheterization now supersedes the numbers of diagnostic catheterization, and allows treatment of certain congenital heart conditions in lieu of open heart surgery. Some of the results of therapeutic catheterization are comparable, if not better than surgery, and may be first line in treatment option. It may also be adjunctive treatment in the care of the child with complex heart disease complementing surgery.

#### **Objective(s) of Training**

The goal of the Structured Training Programme for Paediatric Cardiology:

Many of the diagnostic catheter studies are being replaced by other well-developed imaging methods, such as MR and CT scans. The obvious advantage is the non-invasive nature of these imaging modalities, and it is envisaged that further improvements will lead to reduced scan time and/or radiation dose.

Early detection of heart lesions even in the fetal stage allows counseling to begin as soon as detected and plans in the management to be made early and discussed with the parents. Outcomes have improved as a result of better planning, and it also allows delivery of the newborn in an institution where there is access to appropriate care, expertise and facilities.

Early management at a very young stage through treatment in infancy and follow up into the adolescent and adult age (adult congenital heart disease) allows for the entire continuum of care in a patient with congenital heart disease.

Apart from congenital heart disease, other acquired cardiac conditions have enjoyed better outcomes as well. These include cardiac disease secondary to other systemic conditions, cardiomyopathies, and rhythm disorders.

In view of the above, cardiovascular medicine is poised to be an important subspecialty in paediatrics. The trainee in paediatric cardiology needs to have a broad understanding of cardiovascular disease and in-depth knowledge in the treatment of common problems and cardiac emergencies. It is important that the trainee is properly grounded in paediatrics, and with the knowledge, aptitude and interest, applies this to his/her training in cardiology.

A significant proportion of the training in paediatric cardiology must be hands-on and procedure-based. This implies that the training would take into consideration the need for familiarization of common cardiac procedures. The ability to master echocardiography techniques and make meaningful interpretation in order to complement other knowledge in formulating management plans is essential. Being able to perform cardiac catheterization would auger well for the paediatric cardiology trainee who may wish to consider further specialization in this field in the future.

The two major paediatric centers in Singapore provide the requisite expertise and capability to engage in paediatric cardiology subspecialization training, given that they now provide comprehensive management to children with all varieties of heart conditions.

## **(B) PROGRAMME OVERVIEW**

### **Trainee Duration**

The traineeship programme for Paediatric Cardiology Subspecialty Training is conducted for a period of 2 years, after successful exit from the Paediatric Medicine Residency Training Program.

## **(C) ADMISSION REQUIREMENTS**

### **Entry Criteria/ Pre-requisites**

Applicants must fulfill the following entry criteria/pre-requisites as stated below:

- Commencement of sub-specialty training would be after exiting from Paediatric Medicine residency
- Residents can apply only in their final year of residency (R6)

## **(D) TRAINING SYLLABUS**

### **Competencies for the AST Programme in Paediatric Cardiology**

For the AST Programme, the expected **general competencies** to be achieved at the end of training are as follows:

- a) Acquisition of fundamental knowledge base and ability to apply such knowledge base to provide appropriate clinical care in paediatrics and paediatric cardiology
- b) Acquisition of advanced theoretical knowledge, clinical examination and assessment skills required for competent practice in paediatrics and paediatric cardiology
- c) Acquisition of communication skills to be able to communicate effectively and sensitively with patients and their families, colleagues and other allied health professionals
- d) Ability to recognise the various socio-economic and cultural factors that contribute to illness and vulnerability in patients from diverse backgrounds
- e) Acquisition of advanced life support management skills
- f) Acquisition of all basic and advanced technical skills related to paediatrics and paediatric cardiology
- g) Ability to perform allocated tasks and plans and prioritises tasks appropriately
- h) Ability to work within multi-disciplinary teams and development of leadership skills while still

- accepting leadership from other members of the multi-professional team
- i) Ability to perform allocated teaching and training tasks and plans and deliver teaching to trainees and other professionals
  - j) Development of peer-mentoring skills
  - k) Development of management skills and ability to take responsibility for a defined project
  - l) Ability to design audit projects and understand risk management
  - m) Ability to write appropriate clinical guidelines
  - n) Understanding the principles of critical appraisal and research methodology and appraising the literature critically, with application to clinical practice
  - o) Recognising the need for, and development of, appropriate patient advocacy skills
  - p) Recognising the need to promote and maintain excellence through actively supporting or participating in research and a program of continuing professional development

### Evaluation of Trainees:

**Table 2: Expected frequency of assessments**

	<b>AST – Year 1</b>	<b>AST – Year 2</b>
<b>CBD</b>	2 every 6 months	2 every 6 months
<b>MSF</b>	1 every 6 months	1 every 6 months
<b>Portfolio review</b>	1 every 6 months	1 every 6 months
<b>Supervisor’s report</b>	1 every 6 months	1 every 6 months
<b>Exit Examination</b>		Essential

**Table 3: Other areas of curriculum and assessment**

<b>Patient Care</b>	Lectures, interactive tutorials, journal clubs All trainees must clock in $\geq$ 4 hours training time per week, encompassing these activities.  <b>Assessment:</b> CBD Scholarly Activity Exit Examination
<b>Medical knowledge</b>	
<b>Practice based learning</b>	Cardiology-Cardiothoracic Surgery Case Conference Cardiology Audit Journal club: leads discussions Clinical Practice Improvement Programme or Audit Project Paediatric Cardiology Competencies  <b>Assessment:</b> Supervisor to assess performance
<b>Communication skills</b>	Leads tutorials, supervised teaching of junior residents by senior residents  <b>Assessment:</b> Supervisor to assess performance at tutorials MSF CBD: skills in written documentation

<b>Professionalism</b>	Ethics Workshop Reflective exercises documented for portfolio and discussed with supervisor  <b>Assessment:</b> MSF
<b>System based practice</b>	Morbidity / Mortality rounds / Sentinel events: identifying system errors Health care delivery course  <b>Assessment:</b> MSF: Ability to function as part of a multi-disciplinary team

## **E) INSTITUTIONAL REQUIREMENTS (FACILITIES & RESOURCES)**

### **Minimum and Preferred Teaching Faculty: Trainee Ratio**

All the members of the teaching staff should have received accreditation by the Specialist Accreditation Board. The teaching faculty should represent paediatric cardiologists and the full range of other paediatric subspecialties and other related disciplines such as paediatric surgery, radiology, and child psychiatry. The minimum teaching faculty: trainee ratio will be as determined by the Specialist Accreditation Board.

Designated supervisors as defined by the Specialist Accreditation Board are required to meet and review the trainee's progress every 2 months. The aim of such a review is to ensure that the trainee is exposed to and taught all aspects of the specialty. Deficiencies in training (both theoretical and practical) should be recognised, and appropriate steps taken to overcome them.

### **Requirements for Facilities for Study and Training**

Adequate inpatient and outpatient facilities must be available to meet the needs of the general and subspecialty programmes. There must be a full intensive-care facility, as well as a facility for dealing with paediatric emergency patients. Patients should range in age from the newborn through to the young adult. There should be adequate numbers of inpatients and outpatients, as well as new and follow-up patients so as to ensure sufficient clinical exposure and training. Support services should include clinical laboratories, intensive care, occupational and physiotherapy, speech pathology, diagnostic imaging, respiratory therapy, pathology, pharmacology and social services.

Trainees must have access to on-site library or collection of appropriate texts and journals, as well as computer access to electronic databases and on-line search engines for medical literature.

## **(F) SUPERVISION OF TRAINEES**

### **Supervision of Training**

#### ***Advanced training***

Clinical duties will include supervision of a ward, inpatient consults, outpatient general and subspecialty clinics, and special procedures provided by a subspecialty. Trainees must keep a log of their training activities and record their training experience. Responsibility for supervision is accorded by the consultant heading that particular subspecialty, and includes clinical work, research focus and 6-monthly assessments.

## **(G) ASSESSMENT AND FEEDBACK**

### **Logbook**

All trainees are expected to keep a log book which will be reviewed on a monthly basis by the main supervisor. The log book will have a record of cases managed or consulted. Notes should be made regarding difficult or complicated cases. CME activities should also be recorded.

All other teaching experiences e.g. conferences, seminars, papers presented should also be recorded.

### **Documentation of training**

Documentation of work experience and training received will be Paediatric Cardiology (Appendix A) training portfolios. The Paediatric Cardiology training portfolio must be submitted at the Exit Examination in Paediatric Cardiology. Trainees are expected to attend a minimum of 4 hours of training sessions per week. The training portfolio will help to:

- Trainee's work experience, training
- Education supervision
- Professional development plans
- Workshops attended
- Reflective entries
- Annual review of 6 core competencies
- Requisite formative work assessments

### **Feedback**

Six-monthly interviews with the trainees should be conducted to ensure that the training objectives for each rotation have been adequately met, as well as to monitor for any difficulties in workload and training activities. Feedback forms should also be provided at the end of each posting, and the programme supervisor is responsible for collating the results and instituting the appropriate changes to the training programmes.

## **(H) EXIT EXAMINATION**

### **Exit Examination in Paediatric Cardiology**

The trainee must undergo an Exit Examination in Paediatric Cardiology upon satisfactory completion of advanced training. The trainee must pass the Exit Examination within the stipulated training period (maximum 3 years beyond the stipulated time frame), unless special permission has been obtained from JCST for any extenuating circumstances, in order to be accredited by the Specialist Accreditation Board (SAB) of the Singapore Medical Council (SMC) as a Paediatric Specialist.

### **Application for Exit Examination**

Candidates who have completed the requirements for advanced training and are eligible for the Paediatric Cardiology Exit Examination must submit their completed training portfolios and a letter

from their Heads of Departments indicating that they have fulfilled all the posting requirements satisfactorily. Candidates will be notified of the exit examination dates at least 2 months in advance.

### **Exit Examination Format**

The exit examination shall consist of the following sections:

- Appraisal of the Scholarly Activity, case review on an adolescent problem in Paediatric Cardiology, and assessment of experience and competence based on the log book.
- Structured Examination consisting of the following sections:
  - Clinical case scenario on structural heart defects
  - Clinical case scenario on arrhythmias
  - Clinical case scenario on an emergency cardiology or post-operative issues
  - Journal critique on a problem in Paediatric Cardiology

### **Timing of Exams**

The examinations are held annually, not earlier than 3 months before end of training

## **(I) GENERAL GUIDELINES**

**Please refer to Annex 1 for General JCST Guidelines on the following:**

- Leave Guidelines
- Training Deliverables
- Changes to Training Period
- Part-time Training
- Overseas Training
- Withdrawal of Traineeship
- Exit Certification

## **Appendix A**

### **CURRICULUM FOR AST PROGRAMME IN PAEDIATRIC CARDIOLOGY LEADING TO SPECIALIST ACCREDITATION IN SINGAPORE**

#### **A. General Paediatric Cardiology**

The core curriculum for Paediatric Cardiology will encompass knowledge and skills in the assessment and management of patients presenting with cardiac problems in the acute in-patient, as well as outpatient settings:

- a) Achieve expertise in clinical cardiac examination
  - b) Understand cardiac and vascular anatomy, cardiac and respiratory physiology, and cardiac electrophysiology.
  - c) Understand the pathophysiology of congenital and acquired cardiac diseases in children.
  - d) Knowledge and understanding of normal cardiac rhythm and arrhythmias
  - e) Knowledge and understanding of the embryology of the heart and great vessels
  - f) Knowledge of the role of genetics in certain cardiac conditions, including the principles of genetic counselling in the context of inherited structural heart diseases, cardiomyopathies and rhythm disorders.
  - g) Knowledge and understanding of cardiovascular anatomical and physiological changes in the newborns, including cardiac issues encountered in the term and pre-term neonates.
  - h) Understanding of the role of different investigations and imaging techniques in the investigation of cardiac disorders in children.
  - i) Knowledge and approach to cardiac failure, including acute and chronic therapies, and management of complications
  - j) Understanding of the social implications of congenital heart disease
  - k) Understanding of the principles of prescribing cardiac related medications with regards to manipulation of cardiac output and control of cardiac rhythm
  - l) Advanced knowledge and understanding of the following specific cardiac presentations and disorders:
    - i. Cardiac murmur
    - ii. Syncope
    - iii. Palpitations
    - iv. Chest pain
    - v. Cardiac failure
    - vi. Kawasaki disease and its complications
    - vii. Acute myocarditis
    - viii. Acute pericarditis
    - ix. Cardiomyopathies
    - x. Rheumatic heart disease
    - xi. Infective endocarditis
    - xii. Congenital acyanotic heart diseases
    - xiii. Common cyanotic congenital heart diseases
    - xiv. Common rhythm disorders
  - m) Work in a multi-disciplinary team with cardiothoracic surgeons, intensivists, radiologists, radiographers, nurses and technologists in the management of cardiac patients.
  - n) Performing cardiology-related procedures including cardiac catheterization, pericardiocentesis, transvenous pacing and balloon atrial septostomy.
  - o) Developing protocols in advanced cardiac therapeutics for patients with congenital and acquired heart diseases
- Understanding the principles of critical appraisal and evidence-based practice of paediatric cardiology