



**FACULTY OF  
PAEDIATRICS**

ROYAL COLLEGE OF  
PHYSICIANS OF IRELAND

Post CSCST TRAINING IN

# PAEDIATRIC CARDIOLOGY



**This curriculum of training in 2017 under the specialty of General Paediatrics was developed in 2017 and undergoes an annual review by the Subject Matter Expert Colin Mc Mahon, Dr Ann O’Shaughnessy, Head of Education, Innovation & Research and by the Training Committee. The curriculum is approved by the Faculty of Paediatrics of Royal College of Physicians of Ireland.**

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## Table of Contents

Introduction .....	5
Recruitment and Selection.....	5
Duration and Organisation of Training .....	5
Training Programme .....	5
Trainee Numbers .....	5
ePortfolio .....	6
Programme Management.....	6
Specialty Section .....	7
Growth and Nutrition .....	8
Lifestyle .....	9
Evaluation of a Child with a Cardiac Murmur .....	10
Evaluation of the child with Chest Pain, Palpitations or Syncope .....	11
Arrhythmias .....	13
Cardiovascular Collapse in Infancy.....	15
Cardiac Failure in Infants and Children .....	16
Acyanotic Congenital Heart Disease throughout Childhood .....	17
Cyanotic Heart Disease in the Newborn Period.....	18
Cyanotic Heart Disease beyond the Newborn Period .....	19
Practical Procedures and Investigations .....	21
Chest X-Ray .....	22
Transthoracic Echocardiography .....	23
Ambulatory ECG and External Cardiac Loop Recorder .....	25
Ambulatory Blood Pressure .....	26
Exercise Tests.....	27
ECG with Adenosine Challenge .....	28
Tilt Table Testing .....	29
Cardiac Pacing.....	30
Cardiovascular evaluation of the child with features of a syndrome or genetic condition.....	31
Cardiac Evaluation of a Child with Stridor .....	33
Cardiac Evaluation of a Child with Systemic Hypertension .....	34
Cardiomyopathy and Myocarditis.....	35
Inflammatory Cardiovascular Disease .....	36
Prevention and Management of Infective Endocarditis.....	37
Management of Critically Ill Children with Cardiovascular Compromise .....	38

Cardiovascular Abnormalities in Neonatal Intensive Care .....	39
Immunisation and Immunity.....	40
Pulmonary Hypertension .....	41
Assessment of Children with Cardiac Disease Prior to Non-Cardiac Surgery .....	42
Minimum Requirements.....	43

## Introduction

The Post CSCST Fellowship in Paediatric Cardiology is a one year programme designed to dovetail with the Higher Specialist Training programme in General Paediatrics. It takes into account the major areas of competence required by the subspecialist in Paediatric Cardiology and will be supervised by the Faculty of Paediatrics of the Royal College of Physicians in Ireland. Completion of this program will ensure the knowledge and competencies in all areas of the curriculum, meeting international standards for best practice and allowing candidates to practice as a subspecialist in Paediatric Cardiology. Applicants for the Post CSCST Fellowship in Paediatric Cardiology will have successfully completed the RCPI Higher Specialist Training programme in General Paediatrics within two years of the start date of the Post CSCST Fellowship programme.

Prior experience in Paediatric Cardiology during General Paediatrics training would be an advantage.

### Recruitment and Selection

Post CSCST Fellowship training in Paediatric Cardiology will build on broad basic and early core specialist training in General Paediatrics. This is in line with training models internationally. Selection of candidates for Post CSCST Fellowship training in Paediatric Cardiology will be via a competitive recruitment process coordinated by the relevant Training Body. Recruitment will follow similar timeline where possible to HST recruitment and post will commence in July of each year (unless otherwise specified).

### Duration and Organisation of Training

The Post CSCST Fellowship in Paediatric Cardiology is a one year training programme designed to dovetail with the Irish Higher Specialist Training programme in General Paediatrics. The curriculum is competency-based, however it is anticipated that the candidate will complete training within one year.

The curriculum takes into account the major areas of competence required by the subspecialist in Paediatric Cardiology and will be supervised by the Faculty of Paediatrics of the Royal College of Physicians in Ireland. Doctors who have successfully completed the RCPI Higher Specialist Training programme in General Paediatrics and are within two years of completion will be deemed eligible to apply for the Post CSCST Fellowship in Paediatric Cardiology. Completion of this program will ensure the knowledge and competencies in all areas of the curriculum, meeting international standards for best practice and allowing candidates to practice as a subspecialist in Paediatric Cardiology.

### Training Programme

The training programme offered will provide opportunities to fulfil all the requirements of the curriculum of training for Paediatric Cardiology in approved training hospitals. Each post within the programme will have a named trainer/educational supervisor and the programme will be under the direction of the Faculty of Paediatrics of the Royal College of Physicians in Ireland.

### Trainee Numbers

It is expected that the Post CSCST Fellowship in Paediatric Cardiology will be awarded to one candidate per year.

**ePortfolio**

The trainee will be required to keep their ePortfolio up to date and maintained throughout their Fellowship training. The ePortfolio will be countersigned as appropriate by the Trainer to confirm the satisfactory fulfilment of the required training experience and the acquisition of the competencies set out in the Curriculum. This will remain the property of the Trainee and must be produced at the end of year Evaluation meeting. At the end of year Evaluation, the ePortfolio will be examined. The results of any assessments and reports by the named trainer/educational supervisor, together with other material capable of confirming the trainee's achievements, will be reviewed.

**Programme Management**

- Coordination of the training programme will lie with the Medical Training Department.
- The training year will usually run from July to July in line with HST programmes
- Annual evaluations will usually take place between April and June each year
- Each trainee will be registered to the ePortfolio and will be expected to fulfil all requirements relating to the management of yearly training records
- Opportunities for audit and research may be available
- Each trainee will be issued with a training agreement on appointment to the training programme and will be required to adhere to all policies and procedures relating to Post CSCST Fellowships.

## **Specialty Section**

## Growth and Nutrition

**Objective:** To be able to recognise nutrition and growth problems related to congenital heart disease and direct appropriate strategies to optimise nutritional intake and maximise growth

### KNOWLEDGE

- The causes of growth failure in congenital heart disease
- How to manage fluid and calorie intake in children with cardiovascular disease
- Understand the principles of how to manage fluid balance after cardiac surgery
- The indications for supplementary feeding regimens including nasogastric tube feeds
- The indications for parenteral nutrition
- Understand the causes of chylothorax, be familiar with the investigations and management within the specialist centre, including the role and ongoing supervision of a medium chain triglyceride diet
- How drug therapy may affect appetite and biochemical homeostasis with consequent effects on growth
- Know the complications of parenteral nutrition

### SKILLS

- Understand the management of fluid intake and fluid balance around the time of cardiac surgery
- Recognise failure to thrive and be able to identify cardiac and non-cardiac causes
- Identify iron deficiency in patients with cyanotic congenital heart disease
- Recognise the complications of long term nasogastric feeding regimens and the role of specialist speech and language therapists
- Recognise the importance of nursing staff and dieticians in supervising and advising on nutrition
- Provide information to parents about feeding regimes
- Institute and monitor feeding regimes in children with cardiac failure
- Identify when failure to thrive has not responded to optimising nutrition and make timely referral to specialist cardiac team for decision regarding potential surgical intervention in congenital heart disease patients.
- Appropriate referral to the dietetics department

### ASSESSMENT & LEARNING METHODS

- DOPS - Fluid and electrolyte balance



## Lifestyle

**Objective:** To know about, promote, and support lifestyle measures to minimise cardiovascular risk

### KNOWLEDGE

- The lifestyle risk factors for adverse outcome in patients with cardiac conditions including:
  - diet
  - exercise
  - social deprivation
  - occupation
- The effect of obesity on health with particular relevance to cardiac conditions
- The effects of smoking on health with particular relevance to cardiac conditions
- The effects of illicit drugs and alcohol on health with particular relevance to cardiac conditions

### SKILLS

- Promote the importance of healthy lifestyle choices
- Recognise patients' current or emergent lifestyle factors or choices which may lead to adverse health outcomes
- Raise and discuss issues of lifestyle with patients and their families to enable them to understand and make healthy lifestyle choices
- Signpost support resources and involve other health professionals to help with lifestyle changes where beneficial
- Suppress any display of personal judgment
- Appropriate referral to the dietetics department

### ASSESSMENT & LEARNING METHODS

- Present Health Promotion talk on prevention of childhood obesity
- Develop an Exercise Plan

## Evaluation of a Child with a Cardiac Murmur

**Objective:** To be able to carry out specialist assessment and treatment of children with cardiac murmurs

### KNOWLEDGE

- The range and significance of symptoms associated with congenital and acquired diseases of the cardiovascular system in all ages
- The physical signs that may be found on examination of the cardiovascular system and how to interpret those findings
- The characteristic clinical features of different congenital cardiac defects
- The characteristic features of innocent murmurs
- Understand the likely concerns of parents of children who have been referred for evaluation of a heart murmur
- Understand the limitations of echocardiography and the need to discuss cases with the specialist cardiologist, when appropriate

### SKILLS

- Obtain a relevant history and perform expert cardiac examination
- Discriminate innocent from pathological murmurs on examination
- Make a logical provisional diagnosis on the basis of physical examination
- Refine the provisional clinical diagnosis using ECG and CXR where appropriate
- Use echocardiography to accurately identify normal cardiac structure and function, or recognise and identify abnormality
- Complete the assessment thoroughly and quickly
- Confidently diagnose normality and explain the meaning of an innocent murmur

### ASSESSMENT & LEARNING METHODS

- DOPS: Echocardiography
- Record of 400 echocardiograms (250 supervised)
- MiniCex:
- Identification Innocent murmur and normal
- Indications for echocardiogram

## Evaluation of the child with Chest Pain, Palpitations or Syncope

**Objective:** To be able to carry out initial assessment and treatment of children and adolescents with chest pain, palpitations, pre-syncope or syncope

### KNOWLEDGE

- The cardiac and non-cardiac causes of loss of consciousness
- The clinical features that discriminate between arrhythmias, vasovagal syncope and seizures in patients with loss of consciousness
- The clinical features that suggest an arrhythmia in patients with palpitations
- The causes of chest pain in childhood
- The clinical features that characterise the various causes of chest pain
- The range of structural heart disease that present with chest pain, palpitations or syncope

### SKILLS

- The indications for an exercise test, ambulatory ECG, cardiac event recorder and tilt-table test in the investigation of these conditions and know when these tests should be done under the guidance of the specialist cardiac centre
- The role of genetic testing in families with possible or proven inherited congenital cardiac conditions
- Take an appropriate detailed history, eliciting all information that may help discriminate between cardiac and non-cardiac causes of chest pain, palpitations and syncope
- Make a logical provisional diagnosis on the basis of history and physical examination
- Identify features on the 12-lead ECG that suggest a substrate for an arrhythmia
- Identify ECG evidence of ischaemic heart disease and ventricular hypertrophy
- Use echocardiography to accurately identify normal cardiac structure and function and to recognise and make a correct initial diagnosis of abnormality
- Make an appropriate plan for further investigation and follow-up
- Complete the assessment quickly in an outpatient setting
- Diagnose normality
- Institute and monitor appropriate treatment for arrhythmias and vasovagal syncope
- Explain the plan for further investigation and the reasons for this line of investigation in terms understandable to the patient and parents
- Explain the likely diagnosis and its impact on lifestyle
- Provide reassurance where there is no organic cause for symptoms
- Refer appropriately to other specialties when a non-cardiac cause is likely

### ASSESSMENT & LEARNING METHODS

- DOPS:
  - 12 Lead ECG
  - Exercise testing
  - Echocardiography

- Record of:
  - 10 Exercise tests
  - 400 Echocardiograms (250 supervised)
- MiniCex

## Arrhythmias

**Objective:** To be able to carry out assessment and treatment of children and adolescents with arrhythmias in liaison with the specialist cardiac centre

### KNOWLEDGE

- The natural history, presentation and clinical features of common arrhythmias from foetus to adolescent
- Know the mechanisms involved in the development of cardiac arrhythmias
- The genetic disorders associated with cardiac arrhythmias and indications for genetic referral
- The types of structural heart disease and types of cardiac surgery associated with arrhythmias
- The characteristic ECG findings of common tachyarrhythmias and bradyarrhythmias, and the features suggesting risk of arrhythmia in the resting ECG
- The indications for exercise testing, ambulatory monitoring, and external loop ECG recording
- Understand the classification, mechanism of action, interactions, side effects, contraindications and clinical use of antiarrhythmic drugs in paediatric patients
- Know the indications for DC cardioversion and defibrillation

### SKILLS

- Take a history in a patient with palpitations, perform an expert examination and decide whether an arrhythmia is likely
- Form an appropriate plan of further investigation in a patient with suspected arrhythmias
- Recognise and manage SVT from neonatal to adolescent life, in liaison with SSC or CCC
- Identify the type of arrhythmia present from a 12 lead ECG capturing a rhythm abnormality
- Interpret 24 hour and external loop ECG recordings, and know when to seek further help in interpretation
- Supervise an exercise test and make an initial interpretation of the results
- Perform vagal manoeuvres, DC cardioversion, and defibrillation appropriately in the emergency treatment of tachyarrhythmias
- Explain the rationale, side effects and risks of arrhythmia treatments (including expectant approach) to patients and their families
- Explain the common arrhythmias and their associated risks to patients and their families
- Offer appropriate management options and warning signs to the patient and family
- Provide advice in respect of sports and exercise
- Identify possible inherited cardiac conditions and refer to specialist centre and clinical geneticist
- Understand the importance of patient education in managing ongoing symptoms and determining the most appropriate treatment for each individual
- Know limitations and when to refer to a specialist paediatric cardiologist for expert advice, assessment, and management of arrhythmias
- Perform and interpret an ECG taken during an adenosine challenge

- Select the appropriate emergency treatments and be familiar with the longer term drug treatments used by the specialist unit for common tachyarrhythmias

#### **ASSESSMENT & LEARNING METHODS**

- DOPS:
  - Vagal manoeuvres
  - DC cardioversion
  - Defibrillation
  - ECG –adenosine challenge
- ACLS or APLS

## Cardiovascular Collapse in Infancy

**Objective:** To be able to carry out preliminary specialist assessment and treatment of infants who present with cardiovascular collapse

### KNOWLEDGE

- The physiology of duct dependent systemic and pulmonary circulation
- The natural history, anatomy, physiology and clinical features of cardiac disorders that cause collapse in infancy
- The cardiac causes of cardiovascular collapse and likely diagnoses on the basis of the timing of presentation
- How to distinguish cardiac and non-cardiac causes of cardiovascular collapse
- The indications, contraindications, and side effects of prostaglandin E therapy for duct dependent systemic and pulmonary circulation
- Know the impact of cardiovascular collapse on other organs
- The indications, limitations and risks of non-invasive and invasive investigation of infants that present with collapse
- The ECG, CXR and echocardiographic findings in congenital heart disease presenting with collapse in infancy
- Understand the principles of angiographic and haemodynamic assessment with cardiac catheterisation for infants who present with collapse and congenital heart disease
- Know the role and risks of catheter intervention and surgery in congenital heart presenting with collapse

### SKILLS

- Take a relevant history and perform an appropriate examination
- Interpret ECG, CXR and blood results and appreciate their importance and limitations in reaching a diagnosis
- Initiate prostaglandin E where appropriate and know how to monitor its effect and when to alter the dose administered prior to transfer to SSC
- Recognise and respond appropriately to the urgency of the clinical situation
- Identify cardiovascular collapse and carry out or direct resuscitation, medical treatment including high dependency care, and stabilisation prior to transfer to SSC
- Use echocardiography as an aid to recognising and/or making a provisional diagnosis of abnormalities in cardiac structure or function associated with collapse in infancy
- Understand the difficulties in diagnosing some cardiac abnormalities on echocardiography and to liaise with the SSC or CCC as appropriate.
- Identify where information is incomplete and refer appropriately for to SSC or CCC for further investigation either by non-invasive imaging or cardiac catheterization

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Echocardiography
- Record of 400 echocardiograms (250 supervised)
- ACLS/APLS

## Cardiac Failure in Infants and Children

**Objective:** To be able to carry out preliminary specialist assessment and treatment of cardiac failure in infants and children

### KNOWLEDGE

- Physiology of cardiac failure caused by:
  - Pressure overload
  - Volume overload
  - Restriction to inflow
  - Reduced contractility
- Physiology of pulmonary oedema
- The natural history, anatomy, physiology and clinical features of disorders that cause cardiac failure at different ages, from newborn to adult life
- The causes of cardiac failure and identify likely diagnoses on the basis of the timing of presentation
- How to distinguish cardiac failure from other causes of increased respiratory effort
- The indications, contraindications, action and side-effects of drug treatment for cardiac failure
- The ECG, CXR and key echocardiographic findings in cardiac disorders presenting with cardiac failure

### SKILLS

- Identify cardiac failure in paediatric patients throughout childhood.
- Take a relevant history and perform an appropriate examination
- Make a provisional anatomical and physiological diagnosis of the cause of cardiac failure on the basis of the clinical information and investigations, prior to referral to the specialist centre
- Optimise nutrition and manage failure to thrive caused by cardiac failure
- Appreciate the role of cardiac nurses and cardiac community nurses in managing chronic cardiac failure
- Interpret ECG, CXR and blood results and appreciate the importance and limitations of these investigations in diagnosing cardiac failure and elucidating its underlying cause
- Use echocardiography to look for and/or provisionally diagnose abnormalities in cardiac structure or function associated with cardiac failure in infants and children prior to timely transfer to SSC or CCC.
- Identify where information is incomplete and refer appropriately to a SSC or CCC for further investigation either by non-invasive imaging or cardiac catheterisation
- Institute appropriate drug therapy for cardiac failure and monitor its success and complications

### ASSESSMENT & LEARNING METHODS

- DOPS: Echo
- Record of 400 echocardiograms (250 supervised)



## Acyanotic Congenital Heart Disease throughout Childhood

**Objective:** To be able to carry out preliminary specialist assessment and treatment of children with acyanotic congenital heart disease

### KNOWLEDGE

- The principal anatomy, physiology, epidemiology, natural history, associations, and genetic implications of the main acyanotic congenital heart defects including:
  - Atrial septal defect
  - Ventricular septal defect
  - Atrioventricular septal defect
  - Patent arterial duct
  - Aortopulmonary septal defect
  - Pulmonary stenosis
  - Aortic stenosis
  - Coarctation of the aorta
  - Interrupted aortic arch
  - Hypoplastic left heart syndrome
- The impact of left to right shunts on pulmonary vascular resistance and the physiology of Eisenmenger syndrome
- The nature and timing of clinical presentations and long term complications of the above acyanotic congenital heart defects
- The key ECG, CXR and echocardiographic findings of the main lesions
- The national recommendations regarding the prevention and management of infective endocarditis
- The indications, limitations and risks of non-invasive and invasive investigation
- The principles of angiographic and haemodynamic assessment by cardiac catheterisation
- The range of surgical and catheter intervention treatment options including their main advantages and success rates, disadvantages and complications
- The normal course of postoperative recovery and potential complications after surgery for the main lesions

### SKILLS

- Make a provisional diagnosis and discriminate between acyanotic defects on the basis of presentation, clinical findings, ECG and CXR
- Use transthoracic echocardiography to make a provisional diagnosis of acyanotic defects and to define their main anatomical and physiological characteristics

### ASSESSMENT & LEARNING METHODS

- DOPS: Transthoracic echo
- Record of 400 echocardiograms (250 supervised)

## Cyanotic Heart Disease in the Newborn Period

**Objective:** To be able to carry out initial preliminary specialist assessment and treatment of cyanotic newborn

### KNOWLEDGE

- The physiology of cyanosis caused by:
  - Right heart obstruction with right to left shunting
  - Parallel circulation
  - Common mixing lesions
- Understand the physiology of duct dependent pulmonary circulation
- The natural history, anatomy, physiology and clinical features of congenital heart disease causing cyanosis in the newborn period
- How to distinguish cardiac and non-cardiac causes of cyanosis in the newborn period
- The indications, limitations and risks non-invasive and invasive investigation in newborns
- The ECG, CXR and echocardiographic findings for the main cyanotic lesions presenting in infancy
- The indications, contraindications, and side effects of prostaglandin E therapy for duct dependent pulmonary circulation
- The role and risks of catheter intervention and surgery in congenital heart disease presenting with cyanosis in the newborn period
- Understand the principles of angiographic and haemodynamic assessment by cardiac catheterisation for neonates who present with cyanosis and congenital heart disease

### SKILLS

- Take a relevant history and perform an appropriate examination
- Interpret ECG, CXR and blood results and appreciate their importance and limitations in reaching a diagnosis
- Make an initial anatomical and physiological diagnosis on the basis of the clinical information and investigations
- Initiate prostaglandin E where appropriate and know how to monitor its effect and when to alter the dose administered
- Use echocardiography to recognise and/or provisionally diagnose major abnormalities in cardiac structure or function associated with cyanosis in the newborn period, and recognise when further specialist assessment is essential
- Identify where information is incomplete and refer appropriately to a SSC or CCC for further non-invasive or invasive imaging.

### ASSESSMENT & LEARNING METHODS

- DOPS
- Echo
- Record of 400 echocardiograms (250 supervised)

## Cyanotic Heart Disease beyond the Newborn Period

**Objective:** To be able to carry out preliminary specialist assessment and treatment of children, adolescents and adults with cyanotic congenital heart disease

### KNOWLEDGE

- The principal anatomy, physiology, epidemiology, natural history, associations and genetic implications of the main cyanotic congenital heart defects including:
  - Pulmonary atresia with intact ventricular septum
  - Pulmonary atresia with ventricular septal defect
  - Critical pulmonary stenosis
  - Tetralogy of Fallot
  - Absent pulmonary valve syndrome
  - Transposition of the great arteries with intact ventricular septum
  - Transposition of the great arteries with ventricular septal defect
  - Double outlet right ventricle
  - Common arterial trunk
  - Total anomalous pulmonary venous connection
  - Univentricular atrioventricular connection
  - Complex congenital heart disease associated with abnormalities of cardiac position and situs
- Know the nature and timing of clinical presentations and long term complications of the above
- The indications, limitations and risks of non-invasive and invasive investigation
- Understand the principles of angiographic and haemodynamic assessment by cardiac catheterisation for patients with cyanotic congenital heart disease
- Know the normal course of postoperative recovery after surgery for each type of cyanotic cardiac defect
- The ECG, CXR and echocardiographic findings in patients with cyanotic congenital heart disease
- The range of surgical and catheter intervention treatment options for cyanotic cardiac defects including their main advantages and success rates, disadvantages and complications

### SKILLS

- Make a provisional diagnosis and discriminate between the various cyanotic defects on the basis of presentation, clinical findings, ECG and CXR
- Provide first line emergency treatment for cyanotic spells and liaise with the specialist centre about further management
- Identify when there is cyanosis combined with cardiac failure and initiate medical treatment when necessary
- Appreciate the concerns and anxiety of parents and other family members
- Liaise with the SSC or CCC for advice and/or evaluation when necessary
- Communicate effectively with the with SSC or CCC for the joint management of patients

- Use transthoracic echocardiography to make an initial diagnosis of cyanotic defects and to define their main anatomical and physiological characteristics
- Recognise the wider management issues in children with complex cyanotic defects or syndromes and cooperate with other specialties
- The key anatomical and physiological requirements necessary for a child to tolerate a cavopulmonary circulation
- The key principles of the management of a cavopulmonary circulations in the postoperative period
- Recognise where there may be a failing cavopulmonary circulation requiring urgent SSC or CCC assessment
- Recognise where there may be a failed or failing systemic to pulmonary shunt requiring urgent SSC or CCC assessment
- Recognise the additional stress on parents when their child cannot undergo corrective surgery
- Recognise the need for close support of the family when the child has to undergo multiple procedures
- Recognise when oxygen saturation are inappropriately low in the setting of a cavopulmonary circulation or systemic to pulmonary shunt
- Make a clinical assessment, including transthoracic echocardiography, to identify key reasons for failure of a cavopulmonary circulation or systemic to pulmonary artery shunt

#### **ASSESSMENT & LEARNING METHODS**

- DOPS
  - Transthoracic echography
- Record of 400 echocardiograms (250 supervised)

## Practical Procedures and Investigations

### 12 Lead Electrocardiogram (ECG)

**Objective:** To be able to carry out and interpret the 12 lead ECG throughout childhood

#### KNOWLEDGE

- The principles of electrophysiology relating to the production of the ECG and limitations of the ECG and of differing ECG machines
- The standard lead placement for paediatric ECG recording and lead placement for dextrocardia
- Age related changes in ECG wave forms
- How to evaluate rhythm, hypertrophy, ischaemia, injury and infarction on ECG
- The features of ECG produced using epicardial pacing wires

#### SKILLS

- Perform a 12 lead ECG with accurate lead placement appropriate to the age of the child
- Interpret ECG in relation to age related changes
- Recognise and interpret abnormal QRS axis, atrial enlargement, normal and abnormal patterns of atrial depolarisation, ventricular hypertrophy, normal and abnormal patterns of ventricular depolarisation, normal and abnormal ventricular repolarisation, bundle branch block, heart block, pre-excitation and tachyarrhythmias on the ECG

#### ASSESSMENT & LEARNING METHODS

- DOPS
  - Perform and interpret ECG
- Mini Cex
- Record 300 ECGs

## Chest X-Ray

**Objective:** To be able to interpret a CXR to assist diagnosis and assessment of cardiac conditions throughout childhood

### KNOWLEDGE

- The principles and practice of radiation protection
- The classical abnormalities in cardiac silhouette produced by congenital heart defects
- The characteristic CXR appearances of high and low pulmonary blood flow, pulmonary oedema and pulmonary vascular disease with pulmonary hypertension
- Know the limitations of the CXR in diagnosing and assessing congenital heart disease

### SKILLS

- Diagnose abnormalities in cardiac position and identify when great artery arrangement is abnormal on CXR
- Interpret patterns of pulmonary vasculature on CXR
- Recognise lung pathology on CXR
- Use information on the CXR to assist in making an anatomical and physiological diagnosis in congenital heart disease

### ASSESSMENT & LEARNING METHODS

- DOPS
  - CXR
  - Interpret 40 CXR

## Transthoracic Echocardiography

**Objective:** To be able to perform transthoracic echocardiography throughout childhood to diagnose and assess the common forms of congenital and acquired heart disease and recognise where further more expert assessment is essential

*It is recognised that achieving these objectives to a full level of competence will not occur during a single year. It is essential that this competency is formally assessed during training across the range of structural and functional heart conditions. (Standards for this assessment are detailed in Appendix 1, Section 4.3). Focused continued professional development will be required and formal accreditation is strongly recommended. Currently, the only individual certification pathway and revalidation pathway is via the European route under the auspices of the European Association of Echocardiography and endorsed by the Association of European paediatric cardiology (AEPC) and European society of cardiology (ESC). Ongoing regular personal audit and peer review of practice throughout the doctor's career will be necessary. It is essential that an awareness of personal limitations and confidence to seek review of findings is maintained and that the implications of a failure to recognise important abnormality are appreciated.*

*Trainees and practitioners should recognise that the performance of non-contributory echocardiography should never lead to a delay in obtaining specialist advice or arranging specialist transfer when indicated.*

### KNOWLEDGE

- The physics of 2 dimensional echocardiography, colour Doppler and spectral Doppler
- The factors determining image quality and resolution
- The function of the controls on machines used for echocardiography and Doppler
- The key echocardiographic characteristics of the most commonly encountered congenital heart defects and how to assess the physiology of shunting defects
- Be aware of the limitations of echocardiography and Doppler
- How to assess valve stenosis and regurgitation
- The commonly used indices of ventricular function
- How to relate the measurements of cardiac structures to body size by indexation or z-scores
- Understand the role of advanced echocardiography techniques (e.g. 3D and 4D, tissue tracking)
- Understand the practice, indications and limitations of echo-contrast studies

### SKILLS

- Perform echocardiography to assist the specialist cardiologist during visiting clinics
- Schedule cases for review and audit of echocardiographic assessment
- Develop and work within guidance regarding the range of appropriate cases agreed with the specialist centre
- Interpret the significance and reliability of the information obtained by echocardiography
- Demonstrate ability to work with and share expertise mutually with echocardiography technicians

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Echocardiography
- ECHO Course (EAE course)
- EAE Certification exam
- Record of 400 echocardiograms (250 supervised)



## Ambulatory ECG and External Cardiac Loop Recorder

**Objective:** To be able to request and interpret the results of ambulatory ECG and external cardiac loop recording appropriately in the diagnosis and assessment of children with cardiac conditions

### KNOWLEDGE

- The indications for an ambulatory ECG and external cardiac loop recorder
- The normal range of findings on a paediatric 24 hour ECG
- Understand the limitations of these non-invasive ECG investigations

### SKILLS

- Scan the results of these investigations select appropriate highlights and produce an accurate report
- Interpret the results in the clinical context

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Interpret and perform ambulatory ECG
- Record 300 number of ambulatory ECGs

## Ambulatory Blood Pressure

**Objective:** To be able to request and interpret the results of ambulatory blood pressure monitoring appropriately in the diagnosis, assessment and surveillance of children with cardiac conditions

### KNOWLEDGE

- The indications for an ambulatory blood pressure monitoring
- The normal range of blood pressure and variation throughout the daily cycle
- Understand the limitations of ambulatory blood pressure monitoring

### SKILLS

- Interpret the results in the clinical context

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Interpret ambulatory blood pressure monitoring

## Exercise Tests

**Objective:** To be able to carry out and interpret exercise tests appropriately in the diagnosis and assessment of children with cardiac conditions

### KNOWLEDGE

- The physiology of cardiovascular response to exercise
- The contraindications and age limitations to exercise testing in children
- The methodology of a treadmill (exercise) test
- The normal heart rate and blood pressure responses to exercise
- Be aware of the sensitivity, specificity and predictive accuracy of exercise ECG
- Understand the limitations of exercise testing in children

### SKILLS

- Interpret changes in the ECG during the exercise test
- Interpret changes in heart rate, blood pressure and oxygen saturation during an exercise test

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Perform and interpret exercise tests
- Record 10 exercise tests

## ECG with Adenosine Challenge

**Objective:** To be able to safely carry out and interpret an ECG taken during an adenosine challenge

### KNOWLEDGE

- Know the indications for and possible interpretations of adenosine challenges during tachycardias

### SKILLS

- Acquire an ECG during an adenosine challenge with appropriate monitoring and resuscitation equipment available
- Provide explanation to patients and parents about the effect of adenosine administration
- Diagnose the mechanism of an arrhythmia based on the result of the adenosine challenge

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Perform adenosine challenge ECG
- Record 5 adenosine challenge ECGs

## Tilt Table Testing

**Objective:** To understand the role, principles, practice, and limitations of tilt table testing in patients with syncope

### KNOWLEDGE

- The physiological principles of tilt table testing
- The indications for tilt table testing
- The methodology of tilt table testing
- The risk and limitations, sensitivity and specificity of tilt table testing

### SKILLS

- Refer for tilt table testing appropriately and with a clear objective
- Make an initial interpretation of the findings of a tilt table test

### ASSESSMENT & LEARNING METHODS

- DOPS
- DOPS
  - DC cardioversion
- Record of 1 DC cardioversion
- ACLS/APLS

## Cardiac Pacing

**Objective:** To understand the principles of temporary and permanent pacing and pacemaker monitoring

### KNOWLEDGE

- Basic electrophysiology and cardiac anatomy relevant to pacing
- The indications for temporary and permanent pacing
- The problems, limitations, and complications of pacing and pacemaker dysfunction
- About the potential psychosocial impact of requiring a pacemaker on children and their families
- The main types of pacing, the nomenclature and key features of the surface ECG
- The principles of monitoring, interrogating and programming pacemakers

### SKILLS

- Be able to recognize appropriate and non-functioning pacing on the surface ECG

### ASSESSMENT & LEARNING METHODS

- ECG Course
- DOPS
  - Interpret non-functioning pacing on ECG
- Attend 3 pacing clinics

## Cardiovascular evaluation of the child with features of a syndrome or genetic condition

**Objective:** To be able to carry out cardiac assessment and treatment of children with genetic disorders and syndromes in liaison with the specialist centre team

### KNOWLEDGE

- Know the main cardiac abnormalities found in common genetic disorders and syndromes including:
  - Trisomy 21 (Down syndrome)
  - Trisomy 18 (Edwards Syndrome)
  - Trisomy 13 (Patau syndrome)
  - Monosomy XO (Turner syndrome)
  - Noonan syndrome
  - Williams syndrome
  - Alagille syndrome
  - Marfan syndrome
  - 22q11 deletion
  - CHARGE association
  - VACTERL association
  - Inherited arrhythmias including channelopathies

### SKILLS

- Be aware of the main cardiac abnormalities found in less common genetic disorders and syndromes including:
  - Storage diseases
  - Neuromuscular diseases
  - Mitochondrial cytopathies
  - Hyperlipidaemias
  - Inherited Cardiomyopathies
- Know the prognosis of genetic syndromes and their associated cardiac disorders
- Understand the importance and practice of screening for cardiac conditions with a genetic basis
- Be aware of the importance of fetal cardiology review for future pregnancies
- Recognise the importance of the multidisciplinary team in the management of patients in this group
- Recognise the impact of other features of the genetic disorder or syndrome on cardiac management
- Be willing to discuss the possibility of recurrence of the cardiac disorder in subsequent children whilst recognising the role of the clinical geneticist in expert counselling of parents about recurrence
- Use transthoracic echocardiography to screen, recognise and/or diagnose specific abnormalities in cardiac structure or function related to genetic disorders and syndromes

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Transthoracic echography
- Record of 250 Transthoracic echocardiography



## Cardiac Evaluation of a Child with Stridor

**Objective:** To be able to carry out preliminary specialist cardiac assessment of children with stridor and know when it is appropriate to refer to the specialist cardiac centre for further evaluation or treatment

### KNOWLEDGE

- The embryology, anatomy and natural history of vascular rings and slings and their association with additional lung pathology
- How to distinguish the cardiac and non-cardiac causes of stridor throughout childhood
- The limitations of transthoracic echocardiography in the identification of vascular rings
- The role and features of vascular rings and slings on CXR, barium swallow, and bronchoscopy
- The role and key features of vascular rings and slings on angiography and MRI
- The role of surgery and main surgical options for release of rings and slings
- Understand the transthoracic echocardiographic findings specific to vascular rings and slings

### SKILLS

- Discuss the main causes, natural history and management of stridor with parents, offering reassurance or referral to the specialist centre as appropriate
- Be aware of the role of thoracic surgeons in children with associated lung abnormalities
- Undertake initial transthoracic echocardiography with the aim of positively identifying the presence of vascular rings and slings to aid discussion and planning with specialist centre
- Select patients who merit referral to specialist cardiac centre for further investigation by advanced echocardiography, bronchoscopy, CT, angiography or MRI

### ASSESSMENT & LEARNING METHODS

- MiniCex

## Cardiac Evaluation of a Child with Systemic Hypertension

**Objective:** To be able to carry out preliminary specialist cardiac assessment of children with hypertension

### KNOWLEDGE

- The physiology of blood pressure control and mechanisms of systemic hypertension
- The methods of single non-invasive and invasive blood pressure evaluation, their pitfalls and limitations and the role of ambulatory blood pressure monitoring
- The references for normal ranges of blood pressure throughout childhood
- The clinical presentations of systemic hypertension including cardiac and extra-cardiac symptoms and signs
- The therapeutic strategies for hypertension, their indications, advantages and disadvantages
- The importance of multidisciplinary team working (e.g. nephrology, ophthalmology, neurology) liaison and the scope of cardiology within this team

### SKILLS

- Perform accurate non-invasive blood pressure measurement
- Identify and monitor the cardiac causes and consequences of systemic hypertension using electrocardiography (ECG) and transthoracic echocardiography
- Refer to other specialists for expert diagnosis and management in cases of systemic hypertension
- Request additional non-cardiovascular investigations appropriately in the investigation of systemic hypertension

### ASSESSMENT & LEARNING METHODS

- MiniCex

## Cardiomyopathy and Myocarditis

**Objective:** To be able to carry out preliminary specialist assessment and treatment of children with cardiomyopathy and myocarditis

### KNOWLEDGE

- The causes, physiology, pathology, natural history, prognosis and clinical features of myocarditis
- The role of genetics in cases of cardiomyopathy and importance of working with the clinical geneticist/inherited cardiovascular disease service
- The range of medical and surgical treatments available for patients with cardiomyopathy and indications for referral
- Be aware of the available forms of circulatory support (LVAD, ECMO)
- Be aware of the role of cardiac transplantation in end-stage cardiomyopathy

### SKILLS

- Be familiar with the main causes, physiology, pathology, natural history, prognosis, genetic implications and clinical features of dilated, hypertrophic and restrictive cardiomyopathy
- Recognise features in the history and examination of myocarditis or cardiomyopathy
- Initiate management of cardiac failure and low cardiac output caused by myocarditis or cardiomyopathy and liaise appropriately with the specialist cardiac centre regarding further management
- Involve the genetics team where appropriate
- Show sensitivity in counselling parents with a child severely affected by cardiomyopathy
- Involve parents in decision making in planning management for end-stage cardiomyopathy in consultation with the SSC or CCC.
- Carry out an initial diagnostic transthoracic echocardiographic evaluation of a child with myocarditis or cardiomyopathy including assessment of cardiac function for discussion with specialist centre
- Exclude conditions which may mimic cardiomyopathy including coronary artery assessment
- Recognise the likely prognosis given by the specialist centre and be able to discuss this with the family if required
- Consider other aspects of disorders underlying the cardiomyopathy or other organs affected in planning for treatment in end-stage cardiomyopathy

### ASSESSMENT & LEARNING METHODS

- MiniCex
- Study Day

## Inflammatory Cardiovascular Disease

**Objective:** To be able to carry out preliminary specialist assessment and treatment of children with rheumatic fever, rheumatic heart disease, Kawasaki disease and other inflammatory diseases affecting the cardiovascular system

### KNOWLEDGE

- The pathology and natural history of rheumatic fever, Kawasaki disease and collagen vascular disease affecting the cardiovascular system
- The cardiac and non-cardiac manifestations of these disorders
- The anatomical and echocardiographic features of these disorders
- The current recommendations for investigation and treatment of acute and chronic Kawasaki disease
- The current recommended drug therapy for acute rheumatic fever and the long term sequelae
- Understand the importance of primary and secondary prevention in rheumatic fever

### SKILLS

- Recognise the clinical features of Kawasaki disease and carry out transthoracic echocardiographic examination of the coronary arteries, maintaining an awareness of the difficulties of such assessment and the importance of specialist centre opinion
- Initiate acute management for Kawasaki disease, and liaise with the specialist cardiac centre regarding the long-term management and appropriate follow up programme.
- Be able to identify the features suggesting rheumatic heart disease on transthoracic echocardiography prior to mandatory referral of such cases for specialist centre assessment
- Initiate the acute treatment for rheumatic fever and recognise the indications for referral to the specialist cardiac centre for intervention or surgery in patients with rheumatic heart disease
- Cooperate with other specialties in the investigation of collagen vascular diseases with cardiovascular involvement
- Understand the indications for referral for specialist investigation including coronary angiography in children with Kawasaki disease

### ASSESSMENT & LEARNING METHODS

- MiniCex

## Prevention and Management of Infective Endocarditis

**Objective:** To be able to carry out preliminary specialist assessment and shared care management of children with infective endocarditis and to be able to provide advice in respect of prevention of endocarditis

### KNOWLEDGE

- The epidemiology, pathophysiology, clinical manifestations, anatomical features, course and prognosis of various types of infective endocarditis
- Which cardiac lesions have the highest risk of endocarditis
- The role of blood cultures, inflammatory markers, transthoracic echocardiography and referral for transoesophageal echocardiography in the diagnosis of infective endocarditis
- The current recommended antibiotic regimes for endocarditis treatment in children
- The national guidance regarding endocarditis prophylaxis
- The indications for referral to specialist centre for consideration of surgical management for patients who have acute valvular insufficiency secondary to endocarditis
- Understand the importance of close cooperation with microbiologists in diagnosing and treating endocarditis

### SKILLS

- Identify the cardiac and extra-cardiac manifestations of endocarditis
- Integrate clinical and laboratory findings to plan appropriate management
- Provide patient education in respect of minimising the risk of endocarditis
- Interpret blood results and recognise transthoracic echocardiographic manifestations of endocarditis and appreciate their importance and limitations in reaching a diagnosis
- Provide support to colleagues and trainees investigating pyrexia of unknown origin

### ASSESSMENT & LEARNING METHODS

- Case Based Discussion

## Management of Critically Ill Children with Cardiovascular Compromise

**Objective:** To be able to make an assessment and initiate treatment of children who are critically ill with severe haemodynamic disturbance

### KNOWLEDGE

- Understand the principles of oxygen supply and demand
- Understand the factors controlling cardiac output
- Understand compensatory mechanisms maintaining cardiovascular homeostasis
- Know the common causes of haemodynamic instability during childhood and know how to differentiate sepsis, hypovolaemia, cardiac failure, cardiac tamponade and hypotension secondary to cardiac rhythm disturbances

### SKILLS

- Recognise the clinical signs of low cardiac output and the clinical signs of progression to shock
- Recognise the biochemical markers of low cardiac output
- Use fluid management and inotropic support appropriately to optimise cardiac output and tissue oxygen delivery
- Recognise the need for intensive care support for children with haemodynamic instability and liaise with intensive care colleagues and specialist units as appropriate
- Communicate the findings of the cardiac assessment clearly and logically with colleagues
- Use transthoracic echocardiography to assist in determining the cause of haemodynamic instability

### ASSESSMENT & LEARNING METHODS

- Attend intensive care unit
- MiniCex
- Case Based Discussion

## Cardiovascular Abnormalities in Neonatal Intensive Care

**Objective:** To be able to carry out preliminary specialist assessment and advise on the treatment of cardiovascular problems commonly arising in the context of neonatal intensive care. Understand the physiology of fetal and transitional circulation

### KNOWLEDGE

- The pathophysiology, clinical manifestations, echocardiographic features and treatment of persistent pulmonary hypertension of the newborn (PPHN)
- The pathophysiology, clinical manifestations and echocardiographic features of patent arterial duct in the preterm child
- The indications and advantages, risks and contraindications of medical and surgical treatment of patent arterial duct in the preterm child
- Be familiar with published neonatal echocardiography standards documents
- Use transthoracic echocardiography to differentiate PPHN from congenital heart disease, recognising the importance of specialist centre assessment in cases of doubt
- Use transthoracic echocardiography to aid exclusion of duct dependent systemic and pulmonary circulation when assessing an infant with a patent arterial duct prior to referral to the specialist centre
- Understand basic neonatal care and how sepsis, lung disease, neurological problems and genetic issues influence cardiac management

### SKILLS

- Identify probable congenital heart disease in premature and low birth weight infants and make an initial management plan, including the likely and most appropriate timing of transfer to specialist cardiac centre

### ASSESSMENT & LEARNING METHODS

- Case Based Discussion

## Immunisation and Immunity

**Objectives:** To understand, practice and support accepted measures to prevent or minimise severity of infection in children with cardiac conditions

### KNOWLEDGE

- The indications for and timing of active and passive immunisation for children with cardiac conditions (and their families where applicable) in addition to the routine immunisation schedule
- Indications for prophylactic measures to minimise severe illness following infective exposures
- The implications of primary and secondary immunodeficiency associated with cardiac conditions or their treatment, and the potential impact on transfusion, immunisation, and other prevention strategies

### SKILLS

- Recognise which patients should receive additional immunisation and refer or organise this appropriately
- Screen for primary immune deficiency and refer patients for immunology assessment and advice when appropriate
- Advise patients, parents and other health professionals about the therapeutic and lifestyle implications and risks of primary and secondary immune dysfunction
- Offer sound advice to patients and their families regarding the secondary effect of cardiac therapies on immunity and immunisation

### ASSESSMENT & LEARNING METHODS

- Case Based Discussion
- Record of 5 immunizations for immune deficient asplenic/22q11 patients



## Pulmonary Hypertension

**Objective:** To make a provisional diagnosis of pulmonary hypertension, be involved in shared care follow up with the specialist cardiac centre, and understand the key management issues for patients with pulmonary hypertension

### KNOWLEDGE

- The main physiological and anatomical mechanisms associated with pulmonary hypertension
- The congenital heart defects which may lead to or be associated with pulmonary hypertension
- Physical signs of pulmonary hypertension
- Key features of pulmonary hypertension on ECG, CXR and echocardiography
- Understand the significance of pulmonary hypertension, either alone or in the context of associated congenital heart disease
- The range of currently available medical and surgical treatments (including lung transplantation) and their key advantages, limitations, and disadvantages
- Understand the principles of cardiac catheterisation in the diagnosis of pulmonary hypertension
- To understand how to support and counsel parents and patients about severe incurable disease

### SKILLS

- Perform a complete history and physical examination to recognise the presence or evolution of pulmonary hypertension
- Interpret ECG in the diagnosis and monitoring of pulmonary hypertension
- Perform echocardiography in the initial diagnosis of the key features of pulmonary hypertension and to monitor basic progress and response to treatment to assist the dialogue with specialist centre

### ASSESSMENT & LEARNING METHODS

- Case Based Discussion
- Attend 2 pulmonary hypertension clinics

## Assessment of Children with Cardiac Disease Prior to Non-Cardiac Surgery

**Objective:** To be able to offer local cardiac support during an anaesthetic pre-operative assessment of children with heart disease prior to non-cardiac surgery and either recommend further specialist assessment or liaise with SSC/CCC to offer advise on their fitness and the appropriate location for such surgery

### KNOWLEDGE

- The cardiac disorders associated with high risk during general anaesthesia (for which surgery and any preoperative assessment should be carried out in specialist cardiac centre)
- The role and limitations of play specialists and psychologists in preparing children for surgery

### SKILLS

- Identify patients who are at increased risk from anaesthesia and recommend when appropriate for anaesthetic to be carried out in setting of SSC/CCC as appropriate
- Select patients who require further investigation by ECG, CXR or echocardiography
- Answer questions from patients and their parents about the impact of their cardiac condition on the safety of anaesthesia and surgery
- Obtain information which would allow determination of the physiology of the cardiac abnormality and make an assessment of the potential cardiac considerations for anaesthetic using ECG,
- CXR and echocardiography, and seek full discussion with SCC/CCC regarding any conclusions
- Liaise with the anaesthetist and surgeon with clear advice about the relevance of any cardiac condition and ensure that the specialist paediatric cardiologist's advice has been sought prior to consideration of any surgery or anaesthetic in high risk cases
- Liaise with specialist cardiologists to recommend an appropriate fluid regime and how cardiac drugs are to be administered in the perioperative period

### ASSESSMENT & LEARNING METHODS

Case based Discussion

## Minimum Requirements for Training Post CSCST Fellowship in Paediatric Cardiology

### Post CSCST Fellowship in Paediatric Cardiology Minimum Requirements for Training

- These are minimum **tracking** requirements. This generally means that in practice, trainees will perform above the stated requirements; however, for record tracking purpose, the following figures have been allocated.
- Where the minimum requirement state “1”, there is no allocated minimum – eLogbook will automatically default to “1”.

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
<b>Section 1 - Training Plan</b>				
<b>Weekly Timetable</b> (Sample Weekly Timetable for Post/Clinical Attachment)	Required	1	Training Programme	Form 045
<b>Personal Goals Plan</b> (Copy of agreed Training Plan for your current training year signed by both Trainee & Trainer)	Required	1	Training Programme	Form 052
<b>Personal Goals Review Form</b>	Desirable	1	Training Programme	Form 137
<b>On Call Rota</b>	Required	1	Training Programme	Form 064
<b>Section 2 - Training Activities</b>				
<b>Outpatient Clinics</b>				
General paediatric clinics	Required	80	Training Programme	Form 001
Pacing Clinics	Required	3	Training Programme	Form 001
Pulmonary hypertension	Required	2	Training Programme	Form 001
<b>Ward Rounds/Consultations</b>				
Consultant Led (minimum 1 per week)	Required	40	Training Programme	Form 002

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
Consultations	Required	40	Training Programme	Form 002
<b>Emergencies/Complicated Cases</b>	Desirable	1	Training Programme	Form 003
<b>Procedures/Practical Skills/Surgical Skills</b>				
Echocardiography (250 supervised)	Required	400	Training Programme	Form 004
Transthoracic echo	Required	250	Training Programme	Form 004
Exercise testing	Required	10	Training Programme	Form 004
Interpret ECG (250 supervised)	Required	300	Training Programme	Form 004
Interpret CXR	Required	40	Training Programme	Form 004
Adenosine challenge ECG	Required	5	Training Programme	Form 004
Tilt table testing	Required	10	Training Programme	Form 004
DC cardioversion	Required	1	Training Programme	Form 004
Immunization for immune deficient asplenic/22q11 patients	Required	5	Training Programme	Form 004
<b>Additional/Special Experience Gained</b>	Desirable	1	Training Programme	Form 005
<b>Relatively Unusual Cases</b>	Desirable	1	Training Programme	Form 019
<b>Chronic Cases/Long term care</b>	Desirable	1	Training Programme	Form 066
<b>ICU/CCU Cases</b>	Desirable	1	Training Programme	Form 090
<b>Management Experience</b>	Desirable	1	Training Programme	Form 110
<b>Section 3 - Educational Activities</b>				
<b>Mandatory Courses</b>				
ACLS/APLS	Required	1	Training Programme	Form 006
ECHO course (EAE)	Required	1	Training Programme	Form 006
ECG course	Required	1	Training Programme	Form 006
<b>Non – Mandatory Courses</b>	Desirable	1	Training Programme	Form 007
<b>Study Days</b> (assist in conducting cardiology or echocardiography study days)	Required	3	Training Programme	Form 008
<b>National/International meetings</b> (PECSIG, BCCA or AEPC)	Required	1	Training Programme	Form 010
<b>In-house activities</b>				

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
Grand Rounds (minimum of 1 per month)	Required	10	Training Programme	Form 011
Cardiology Meeting (average 1 per week)	Required	40	Training Programme	Form 011
Other (minimum of 1 per month from the categories below: )			Training Programme	
Journal Club	Required	2	Training Programme	Form 011
Radiology Conferences	Required	2	Training Programme	Form 011
Pathology Conferences	Required	2	Training Programme	Form 011
MDT Meetings	Required	2	Training Programme	Form 011
Seminar	Required	2	Training Programme	Form 011
Lecture	Required	1	Training Programme	Form 013
<b>Examinations</b>				
EAE certification	Required	1	Training Programme	Form 012
<b>Formal Teaching Activity</b> minimum 1 formal teaching session per month from the categories below: Lecture Tutorial Bed side Teaching	Required	10	Training Programme	Form 013
<b>Research Activities</b>	Desirable	1	Training Programme	Form 014
<b>Audit or Quality improvement activities</b>	Required	1	Training Programme	Form 015
<b>Clinical Audit Report form</b>	Required	1	Training Programme	Form 135
<b>Publications</b>	Desirable	1	Training Programme	Form 016

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
<b>Presentations</b>	Required	1	Training Programme	Form 017
<b>National/International meetings</b> (minimum 1 per year)	Required	1	Training Programme	Form 010
<b>Committee Attendance</b>	Desirable	1	Training Programme	Form 063
<b>Additional Qualifications</b>	Desirable	1	Training Programme	Form 065
<b>Section 4 - Assessments</b>				
<b>CBD</b>	Required	1	Year of Training	Form 020
<b>DOPS</b>				
Fluid and electrolyte balance	Required	1	Training Programme	Form 021
Echocardiography	Required	1	Training Programme	Form 021
Transthoracic echography	Required	1	Training Programme	Form 021
12 Lead ECG – perform and interpret	Required	1	Training Programme	Form 021
Exercise Testing	Required	1	Training Programme	Form 021
ECG – adenosine challenge	Required	1	Training Programme	Form 021
Vagal maneuvers	Required	1	Training Programme	Form 021
DC cardioversion	Required	1	Training Programme	Form 021
Defibrillation	Required	1	Training Programme	Form 021
Interpret CXR	Required	1	Training Programme	Form 021
Interpret ambulatory blood pressure monitoring	Required	1	Training Programme	Form 021
Adenosine challenge ECG	Required	1	Training Programme	Form 021
Tilt table testing	Required	1	Training Programme	Form 021
DC cardioversion	Required	1	Training Programme	Form 021
Interpret non functioning pacing on ECG	Required	1	Training Programme	Form 021
<b>Mini-CEX</b> (At least two Mini-CEX assessments)	Required	2	Year of Training	Form 023
<b>Quarterly Assessments</b>	Required	4	Year of Training	Form 092
<b>End-of-Post/End-of-Year Assessments</b>	Required	1	Year of Training	Form 092