الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Pediatric Echocardiography Advance Training

Training Program Bylaws

February 2015
Version 1

Contents:

I. Introduction

Echocardiography is a primary means for elucidating the anatomy and physiology of childhood heart disease.

Competence in performance and interpretation of Echocardiography is now essential to the practice of Pediatric Cardiology.

Depending upon one's individual career goals, varying levels of expertise may be expected to be achieved during Fellowship Training.

Echocardiography has evolved over the years and becomes today the backbone of all cardiac imaging modalities. Its diagnostic ability of different Congenital Heart Disease is well recognized and obviates the need for invasive diagnostic methodology. The use of echocardiography is vital in determining the nature of cardiovascular pathology as well as to determine the timing of therapeutic intervention and surgery. Additionally echocardiography is essential for follow-up of patients, to monitor the outcome of such therapies. Moreover, Echocardiography is strong prognostic modality in predicting clinical outcomes of different CHDs.

Since Echocardiography is a specialized form of ultrasound, it is mandatory to be performed and interpreted by specially trained personnel. This includes special training of Sonographers as well as Cardiologists. Echocardiography should not be performed or interpreted until the candidate acquires different levels of training and competencies, which they will during their general pediatric cardiology training. To become an Echo-pediatric cardiologist achieve level II training, further specialty training has to be obtained after completing the subspecialty fellowship training.

Since no organized training program for pediatric cardiology echocardiography is in existence in Saudi Arabia, we intend to propose this training program for fellows, who are interested in specializing in this field.

II. Objectives of Training in Pediatric Echocardiography

TTE (transthoracic Echocardiography) is a primary diagnostic imaging modality in children with congenital heart disease, pediatric cardiologist must possess basic skills performance and interpretation of ultrasound modality including M-mode, 2D/3D imaging, various Doppler methods, tissue Doppler, assessment of systolic, diastolic, regional myocardial function in normal pediatric patients and with congenital or acquired heart disease, to include stress echocardiographic studies, transesophageal, and fetal echocardiography.

This Program is aimed to provide:

1. Advanced knowledge base of expertise:

    1.1. In-depth knowledge of ultrasound physics
    1.2. Ability to recognize and characterize rare and complex congenital and acquired cardiovascular abnormalities in a variety of clinical settings
    1.3. In-depth understanding of Doppler methods and their application to the assessment of cardiovascular physiology
    1.4. Familiarity with all echocardiographic methods available for assessment of global and regional ventricular function and knowledge of the strengths and weaknesses of these techniques
    1.5. Up-to-date knowledge of recent advances in the field of noninvasive cardiac imaging, including ability to review critically published research that pertains to the field
    1.6. Knowledge of current training guidelines and regulations relevant to pediatric echocardiography

2. Required skills for advanced levels of expertise:

    2.1. Ability to perform independently a complete transthoracic echocardiographic examination with proper use of all available ultrasound techniques in patients with all types of congenital heart disease

2.2. Ability to assess cardiovascular physiology and global and regional ventricular function using a variety of ultrasound techniques
2.3. Ability to supervise

3. Training methods for advanced levels of expertise

3.1. Perform at least 500 additional transthoracic echocardiograms (at least 50 in infants age less than 1 year) review and critique of the examinations by the responsible staff pediatric echo cardiographer*. At least 10% of which include tissue Doppler and/or 3D
3.2. Perform at least 75 additional transesophageal echocardiograms with a qualified staff pediatric echo cardiographer*
3.3. Perform at least 25 studies monitoring interventional procedures
3.4. Trainees should gradually attain a high level of independence; the degree and rate at which independence is attained should be determined by the director of the laboratory
3.5. Prepare and present echocardiographic data at clinical and didactic conferences
3.6. Completed research that involves echocardiography of pediatric heart disease

*Staff Pediatric echo cardiographer is a staff privileged as an echo cardiographer

III. Facilities and Environment

The training would be placed in a pediatric echo laboratory that serves a hospital that has accredited pediatric cardiology fellowship training by the SCFHS.
The hospital has In-patient and Outpatient facilities, neonatal and Pediatric Intensive Care Units, a Pediatric Cardiac Catheterization/Interventional Laboratory and an active Pediatric Cardiac Surgical Program and include active fetal echo program.

The Pediatric Echocardiography Laboratory should be under the supervision of a full time qualified pediatric cardiologist completed advance training in echocardiography (completed level III training) , and whose primary responsibility is supervision of the laboratory.

The laboratory must perform a sufficient number of pediatric transthoracic and pediatric Transesophageal echocardiograms each year, to allow Trainees sufficient exposure to both normal and abnormal examinations. See section of cases required

IV. Candidate Requirements

1. SCFHS requirements for subspecialty fellowship training

2. Graduate of the Saudi Board of Pediatric Cardiology, or equivalent, according to the SCFHS standard for pediatric cardiology qualification. There will be priority for Saudi, Gulf citizens and non-Saudis, who qualified from the Saudi Board of Pediatric Cardiology Program

3. Provide written permission from his/her Sponsoring Institution, to allow the candidate to participate in full time training for the whole program period

4. Pass successfully the interview.

5. Provide three letters of recommendation from Consultants with whom the Candidate has recently worked with.

6. Registration as a Trainee at the Saudi Council for Health Specialties.

7. Training is to be conducted in the Institutions accredited for training by the SCHFS for advance non-invasive echo cardiology training.

V. Structure of the Training Program

The duration of the Fellowship Program will be at least 12 months; with additional one year to complete research requirements if not already completed in one year.
Four main blocks as follows:

1. **Echocardiography:**

   Normal anatomy, image optimization and Advance U/S physics
   Duration: 2-3 months
   Objectives:
   In-depth Knowledge of the Following:

- Normal, abnormal cardiac anatomy with Echocardiography correlation.
- Advance Ultrasound physics and technology of Echocardiography.
- Proper, safe and facile use of ultrasound instruments.
- Echocardiography image optimization.
- M-mode echocardiograms.
- Doppler color-flow mapping.
- Pulsed and continuous-wave spectral Doppler flow analysis.
- Systolic and diastolic function assessment, including tissue Doppler
- Regular attendance and hand practice in the Echocardiography Laboratory for both TTE, TEE and fetal and participation in on call echo duties.
- Regular participation in Academic activities
- Presenting Echocardiography cases in the Surgical Meeting
- Research Activities.

2. **Echocardiography, abnormal anatomy:**

   Expanding form above TTE, TEE and Fetal
   Duration: 2-3 months
   Objectives:
   In-depth Knowledge of the Following:

- Echocardiography anomalies of systemic and pulmonary veins, septa and atrioventricular junction.
- Echocardiography anomalies of the ventriculoarterial junction and great arteries (RVOT, pulmonary atresia, ductus arteriousus and pulmonary arteries, LVOT, HLHS, aortic arch anomalies, Tetralogy of Fallot, truncus arteriosus, transposition of the Great arteries, double outlet ventricle).
- Echocardiographic abnormalities of univentricular heart, Cardiac Heterotaxy Syndrome, congenital coronary arteries, vascular ring, slings, cardiac tumors and connective tissue disorders.
- TTE 3D, Principles of performing 2D/3D, indication, contraindication and interpreting normal and abnormal transesophageal Echocardiography.
- Basic Views, indications of Fetal Echocardiography.
- Regular attendance and hands-on skills in the Echocardiography Laboratory and participating in on call duties.
- Regular participation in Academic activities.
- Presentation of Echocardiography cases in the Surgical Meeting.
- Ability to review critically published clinical research in Echocardiography.

3. <u>Echocardiography, complex and indepedance:</u>

Complexity & Independency
Duration 2-3months

<u>Objectives:</u>

Independent Performance and Interpretation of:

- Complete transthoracic two-dimensional and M-mode echocardiograms, Doppler color-flow mapping, pulsed and continuous-wave spectral Doppler flow analysis in normal pediatric patients and in those with childhood heart disease.
- Independent assessment of systolic, diastolic and regional myocardial function in normal pediatric patients and in those with congenital or acquired heart disease.
- Expertise in the performance and interpretation of pediatric transesophageal echocardiography.
- Master the fundamental skills of determining fetal position, situs, cardiac anatomy and cardiac rhythm under the supervision of a dedicated Pediatric Cardiologist-echo cardiographer. At least 30-50% of studies should be performed independently, including cases with normal and abnormal cardiac anatomy.
- Familiarity with all echocardiographic methods available for assessment of global and regional ventricular function and knowledge of the strengths and weaknesses of these techniques.

- Training of Sonographers and Junior Pediatric Cardiology Trainees.
- Regular attendance, hand-on skills at the Echocardiography Laboratory and on call duties, regular participation in Academic activities
- Presenting Echocardiography cases in the Surgical Meeting
- Participation in basic or clinical research in echocardiography, including presenting original data at one or more Scientific Meetings.
- The last month will be elective to join a local or an International Echocardiography Laboratory or course (according to his own resources)

4. <u>Echocardiography, supervision and research:</u>

Complete Independency& Research Finalization
Duration 2-3months

<u>Objectives</u>:

Assess competency:

- Training of Sonographers and Junior Pediatric Cardiology Trainees.
- Regular attendance, hand-on skills in the Echocardiography Laboratory and on call duties, regular participation in Academic activities.
- Presentation of Echocardiography cases in the Surgical Meeting.
- Review of the Candidate's Log Book to ensure that the minimum requirements are met
- Research that is published or completed and presented as a posted in a required meeting is mandatory for completing training and set for the exam.

VI. Evaluation

1. The Laboratory Director, in consultation with the teaching staff, should evaluate each candidate in writing on a regular basis
   1.1. Both the Laboratory Director and the Training supervisors to ensure that each Candidate is obtaining adequate and balanced experience should review the log regularly.
   1.2. 360 evaluation and end of rotation/block will be conducted. (attach copies)

2. Candidates should maintain a log of all echocardiograms performed and reviewed, including the age of the patient and the diagnosis.

3. If a Candidate does not appear to be progressing adequately during each Block, a meeting should be scheduled as soon as possible to discuss potential remedial measures.

4. Direct observation of the Candidate during performance of echocardiograms provides information about imaging skills and understanding of the ultrasound instruments.

5. Two level III pediatric echocardiographers will assume the supervising role, one form the accredited training center for such training and one from out side. Both with ensure evaluations and onsite observation of training cadidate

6. Final Examinations after completing the requirements and research trainer will be allowed to set for final evaluation:
   6.1. Practical Assessment as follow
      6.1.1. Complete logbook
         6.1.1.1. These reports must be reported and performed by the candidate
         6.1.1.2. The logbook must have been completed before the written exam
   6.2. Written Examination held at the end of the program
   6.3. OSCE/Clinical exam

VII. Vacations, Holidays and On-Calls

In addition to the SCFHS regulation for subspecialty training vacations;

1. Candidates are entitled for a total 4 weeks vacation annually

2. Sick and Maternity Leave shall be compensated for during or at the end of training.

3. On-Call duty shall include a minimum of 6 calls per month, 24 hours per call

4. The Candidate will be on-call with a Junior Cardiology Fellow who will be performing/supervising directly all the TTE and TEEs during the call.

5. The Candidates are expected to carry on regular echo duty the day after their on call and ensure continuity and over all clinical exposure

VIII. Certification

Upon completion of the required training and passing the final examination, A "**Pediatric Cardiac Echocardiography"** training certificate will be awarded upon graduation

IX. Training Center Requirements

1. The Center should have an accredited training program for pediatric cardiology fellowship by the SCFHS

2. There should be at least 4 staff non-invasive Cardiologist dedicated to perform and interpret Echocardiography

3. The director of the lab is qualified as an echo cardiographer who completed training in pediatric echocardiography

4. The Echocardiography Laboratory should perform at least 7000 studies per year.

5. The Echocardiography Laboratory should be able to perform complete transthoracic echocardiography, transesophageal echocardiography, fetal, preoperative echocardiography. In addition to performance of 3-D echo contrast, tissue Doppler and intra cardiac echocardiography (ICE).

6. One training candidate for each center, this can be revised

Pediatric Echocardiography program

DIRECT OBSERVATION EVALUATION FORM

Candidate's Name:

Date:

Consultant name:

Please enter your grade scale of **1 to 9** or N/O or N/A.
Guide to scoring

Unsatisfactory	Satisfactory	Above Expected	Not observed	Not Applicable
1-3	4-6	7-9	N/O	N/A

1-3 is considered unsatisfactory, 4-6 satisfactory and 7-9 is considered above that expected, for the stage of training and level of experience.
If you score 1, 2 or 3 please give a brief example in the comments box. Please feel free to add any other relevant opinions about the strengths and weaknesses.

OBSERVATION	SCORE
1. Puts patient and parents at ease, explains the procedure and behaves in a considerate manner throughout the scan.	
2. Obtains all relevant demographic data, relevant previous treatment and reasons for the scan.	
3. Uses appropriate transducers, machine settings and ultrasound modalities throughout the scan.	
4. Identifies visceroatrial situs and position of the heart	
5. Identifies venous, atrioventricular and ventriculoarterial connections	
6. Identifies abnormalities, distinguishing between normal variants and pathological findings	
7. Knows the differential diagnosis when there are indirect signs of anomalies (eg dilated right heart)	
8. Interprets echo measurements appropriately, demonstrating knowledge of limitations of calculations	
9. Uses colour flow, pulsed wave and continuous wave Doppler when relevant.	
10. Interprets Doppler findings correctly (eg appropriate use of Bernoulli equation and formulae for calculations such as valve area).	
11. Records clear, relevant images with appropriate brevity.	
12. Attends to infection control appropriately.	
13. Documents the echo fully, writing a concise and appropriate report.	

FEEDBACK

Candidate's Signature

Observer Consultant Signature

CARDIAC ECHO LABORATORY

MULTI-SOURCE FEEDBACK FROM ALLIED HEALTH PROFESSIONALS

Name: _____ **Level of training:** ____ **rotation Dates:**_____**Type of Rotation:** _____

Please check the applicable box of participants (who are providing feedback on the key roles of the resident as a communicator, collaborator, manager, patient care advocate and a health care professional):

☐ ECHO lab nurse	☐ ICU consultant	☐ Wards Consultant
☐ OR room nurse	☐ Word Nurse	☐ Other:

	1 Unacceptable	2 Acceptable	3 Outstanding	4 Not Observed
Communicator:				
·Obtains history and discusses procedure with family in in a caring manner.	☐	☐	☐	☐
·Writes appropriate pre-admission orders and history. Obtains informed consent when appropriate	☐	☐	☐	☐
- Gives clear patient/case summary of each case and to staff	☐	☐	☐	☐
·Listens attentively to patient, families and staff.	☐	☐	☐	☐
Collaborator:				
-Recognizes the roles of and interacts effectively with other health professionals.	☐	☐	☐	☐
Manager				
·Demonstrates team leadership skills when appropriate	☐	☐	☐	☐
-Participates in the effective flow of patients through the ECHO lab	☐	☐	☐	☐
Advocacy:				
·Knows when and how to advocate on behalf of patients and/or their families; demonstrates a genuine concern for patient well being.	☐	☐	☐	☐
-Is aware of TEE safety issues	☐	☐	☐	☐
Professionalism:				
·Demonstrates professional maturity; seeks and accepts advice.	☐	☐	☐	☐

Comments: _____

_____

C O N F I D E N T I A L - PLEASE PLACE IN ENVELOPE WHEN COMPLETED: SEAL & RETURN TO DR. RUTLEDGE

Pediatric Echocardiography Program

Direct Observation Evaluation

Candidate Name:

Hospital:

Name of educational supervisor:

Total number of Consultant observed the candidate:

	Range of scores	Mean raters' score
1. Puts patient and parents at ease, explains the procedure and behaves in a considerate manner throughout the scan.		
2. Obtains all relevant demographic data, details of referring doctor, relevant previous treatment and reasons for the scan.		
3. Uses appropriate transducers, machine settings and ultrasound modalities throughout the scan.		
4. Identifies visceroatrial situs and position of the heart		
5. Identifies venous, atrioventricular and ventriculoarterial connections		
6. Identifies abnormalities, distinguishing between normal variants and pathological findings		
7. Knows the differential diagnosis when there are indirect signs of anomalies (eg dilated right heart)		
8. Interprets echo measurements appropriately, demonstrating knowledge of limitations of calculations		
9. Uses colour flow, pulsed wave and continuous wave Doppler when relevant.		
10. Interprets Doppler findings correctly (eg appropriate use of Bernoulli equation and formulae for calculations such as valve area).		
11. Records clear, relevant images with appropriate brevity.		
12. Attends to infection control appropriately.		
13. Documents the echo fully, writing a concise and appropriate report.		
Comments		

Date:

Signature* (signed by educational supervisor):