"This prospectus is made under the provisions of the Universities Act, the Postgraduate Institute of Medicine Ordinance, and the General By-Laws No. 1 of 2016 and By-Laws No. 2 of 2016 for Degree of Doctor of Medicine(MD) and Board Certification as a Specialist"

POST GRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO, SRILANKA

PROSPECTUS

BOARD CERTIFICATION
IN
CARDIOTHORACIC SURGERY

(To be effective from the year 2015)

Specialty Board in Cardiothoracic and Thoracic Surgery

The Board of Study in Surgery

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SPECIALTY TRAINING IN CARDIOTHORACIC SURGERY

1. Introduction

Modern management of Cardiac and Thoracic surgical patients demand a high standard of knowledge and skills, not only in Cardiothoracic Surgery, but also in Cardiology, Cardiac Electrophysiology, Interventional Cardiology, Anaesthesia, Intensive Care, Pulmonology and many other specialties and need a multidisciplinary, conceptual approach. Therefore a highly specialized and a comprehensive training is required for the surgeons who select to practice this specialty.

Cardiothoracic Surgery is the specialty of medicine that deals with the diagnosis, evaluation and surgical management of diseases of the heart, lungs and chest. Cardiothoracic surgeons undertake surgical treatment of a wide range of serious conditions, and Cardiothoracic operations tend to be major and often complex procedures. Many of these operations require support from advanced forms of technology, such as cardiopulmonary bypass, invasive monitoring and minimally invasive equipment. Because of the serious nature of the conditions and the scale of the operations, many Cardiothoracic patients need care in an intensive therapy unit, and Cardiothoracic Surgeons need to be proficient in this aspect of their patients' care too.

Cardiothoracic Surgeons generally work closely with their colleagues in Cardiology, Respiratory Medicine, Oncological Medicine, Anaesthesia and Intensive Care. They also have close professional relationships with other non-medical staff such as perfusionists, intensive care staff and operating department personnel.

A Cardiothoracic Surgeon is a specialized doctor who has obtained additional education and experience in the multidisciplinary approach to the, diagnosis, treatment, and rehabilitation of Cardiac and Thoracic patients, and who devotes his or her professional practice to these activities and to Cardiothoracic research.

The Specialty Board in Cardiothoracic and Thoracic Surgery (SBCTS) is the subspecialty board under Board of Study in Surgery (BOSS) which is responsible in training and assessing Cardiothoracic and Thoracic Surgical trainees.

2. Selection Process for the Training Programme and Guidance for Trainees

2.1. Entry criteria

The candidate should have fulfilled following criteria to be eligible to enter the training programme in Cardiothoracic Surgery.

i. Passed the relevant MD Surgery Examination.
ii. Should not have been Board Certified by the PGIM in any Specialty or Subspecialty.

2.2. Selection Process

The candidates will be selected on the merit based ranking results of the Final MD (Surgery) Examination. The positions available will be indicated by the PGIM in the Circular calling for applications for the relevant MD Examination or before the allocation meeting of appointments for specialties. The number of trainees will be predetermined by the SBCTS every year and approved by the Board of Study in Surgery and Board of Management in consultation with the Ministry of Health. On the basis of the order of merit, the trainee would make the appropriate selection for training.

The selected candidates would be provided with full and comprehensive details of the training programme. This would be available at the PGIM for perusal by prospective candidates prior to the allocation meeting.

2.3. Guidance through the Training Programme

Once the selection is made, the candidate would come under the general purview of the Special Committee of the board of study in surgery (BOSS) that deals with Cardiothoracic Surgery, which is the Specialty Board in Cardiothoracic and Thoracic Surgery (SBCTS).

Each candidate would be allocated to a "Board Certified Trainer" from the SBCTS and would be guided by that person right throughout the training programme

3. Broad exit Outcomes at the end of the Programme

The programme is designed to provide the type of training that would equip the final product to surgically treat various types of Cardiac and Thoracic diseases of the human body through a multidisciplinary approach. It is expected that the fully trained specialist would be up-to-date with all recent developments in the field of Cardiothoracic Surgery and would be in a position to provide holistic care for those patients who need the expertise of a Specialist Cardiothoracic Surgeon to minimize mortality and morbidity of such patients. The curriculum that has been planned and elucidated later on in this document has incorporated a myriad of training activities that need to be undertaken over the full period of training

The exit outcomes of the training programme are as follows:

i. Patient care.
i. Medical knowledge.
ii. Interpersonal and communication skills.
iii. Professionalism.
iv. Practice-based and Evidence-based approach.

4. The competencies required by the Specialist

In order to fulfill the exit outcomes at the end of the training programme, the trainee should be able to achieve the following competencies.

4.1. Apply knowledge of Basic sciences, Cardiac and Thoracic Pathophysiology, Epidemiology, Natural History and Modified outcome of Cardiac and Thoracic diseases in the management of patients.

4.2. Design and implement a prospective database.

4.3. Conduct a clinical trial.

4.4. Train students and juniors in the multimodal management of Cardiac and Thoracic diseases.

4.5. Perform special and specialized Cardiac and Thoracic operations in patients with advanced or recurrent problems in premeditated and unpredicted situations.

4.6. Determine the best management option from available treatment modalities for individual Cardiac and Thoracic patients.

4.7. Apply the knowledge of other specialties such as Radiology, Electrocardiography, Echocardiography, Angiocardiography and Interventional Cardiology in the management of the patients.

4.8. Identify potential benefits, risks and potential complications of multidisciplinary therapy and selection of patients for surgical therapy in combination with other forms of treatment.

4.9. Develop and support the institutional programmes relating to Cardiac and Thoracic problems inclusive of Cardiothoracic Registry, institutional policies regarding Cardiothoracic programmes/problems and Psycho-social and rehabilitative programmes for Cardiac and Thoracic patients and their families.

4.10. Manage Cardiac and Thoracic emergencies which need Surgical Intervention.

5. Training content and curriculum

The details are described in **Annexure. 1**

6. Training Programme Details and Structure

6.1. Details of logistics

Total duration of training is FOUR years two of which should be at a local center/centers and the other two should be at an overseas center/centers.

Local training - Two years, of which 18 months should be in Adult Cardiothoracic Surgery, 4 months should be in Paediatric Cardiothoracic Surgery and the remaining 2 months should be in Thoracic Surgery under board certified trainers recognized by SBCTS.

Overseas training - Minimum of TWO years in center/centers of excellence abroad. The trainee can continue in the same center or change to a different center with necessary facilities for the second year if he/she wishes.

6.2. Research Project leading to a Dissertation.

Successfully carrying out a research project is a **mandatory requirement** that needs to be fulfilled to be eligible to appear for the Pre-Board Certification Assessment (PBCA).

It should be a study which is either hospital based or community based and could be in the fields of clinical, epidemiological, genetic or immunological areas of Cardiothoracic Surgery. It may be observational or interventional in type.

All aspects of the study have to be assessed and accepted to be satisfactory by the SBCTS ***before embarking on the proposed study***. The draft proposal prepared according to Annexure 2 should be submitted to the SBCTS for this purpose. The project could be undertaken at any time during the higher surgical training period (overseas or local). Evidence of ethical clearance must be submitted before final approval of the proposed study by the SBCTS if indicated. The supervisor would be the trainer where the work is to be carried out. (Instructions to supervisor Annexure 4)

The supervisor should submit a progress report to the SBCTS every six months using the form in Annexure 5**.** All projects would need informed written consent and interventional studies have to be registered with the relevant Clinical Trials Registry. The project, once completed should be submitted according to format in Annexure 6. The two examiners appointed by the SBCTS would assess the project based on the marking scheme in Annexure 7.

A minimum mark of 60 per cent is necessary for the dissertation to be accepted by the SBCTS

Final outcome of the dissertation should be a publication in a journal or a presentation in a forum accepted by SBCTS, based on the approved research project. The project report should be submitted within 3 months of completion of clinical programme. Either outcome is necessary to be eligible for the PBCA.

6.3. Case record book

The trainee is expected to write up THREE cases in Cardiothoracic Surgery after extensive reading. ONE published case report in an Index Journal or TWO presentations in a forum/forums accepted by the SBCTS can be substituted for the 3 cases provided the trainee being the first author. The supervisor has to certify that the trainee's contribution for the publication justifies exemption from the case record book.

6.4. Clinical Audit

It is a mandatory requirement for the trainee to do a minimum of one completed Clinical Audit which should be formally presented. Documentary evidence of such an audit presentation must be provided to the SBCTS.

6.5. Portfolio

The portfolio is a framework containing evidence of the achievements of learning outcomes, over time. This evidence should be supplemented by the portfolio builders' reflections, on his/her learning and can be used to provide feedback to the learner. The training portfolio should include evidence of specialized procedures, critical care management of Cardiac and Thoracic Surgical patients, outpatient clinic duties, special attendances, grand rounds, conferences, teaching courses, and on-call commitments. The portfolio should be prepared and submitted according to the format indicated in Annexure 8. The portfolio must be built by the trainee and be up to date at all times during the training period including the overseas training. The portfolio must be regularly inspected and signed by the supervising consultant and it will have to be produced at the assessments.

The fundamental basis of Portfolio maintenance is Reflective Practice, which is an important tool in postgraduate training.
Reflective practice consists of,

1. Focused self-assessment.
2. Reflecting on experience.
3. Reflecting on strengths, weaknesses and areas for development.
4. Design of own strategies that leads to improvement in practice.

Using such a process will improve training by self-identification of strengths and weaknesses. This is expected to promote deep learning, document what the trainee already knows; identify areas for improvement and helps in planning further learning. This approach promotes self-directed learning and critical thinking skills

The objectives of maintaining a Portfolio are,

1. To help the trainee to record his or her training in brief so that the experience acquired can be assessed and deficiencies identified and remedied.
2. To help supervisors and assessors to evaluate the overall training and provide guidance in areas where it is needed.

The Portfolio should contain documentary evidence of the following,

1. Subject expertise
   a. *Progress reports from supervisors*
   b. *Log of procedures carried out*
   c. *Results of any workplace assessments*
   d. *Other forms of gaining knowledge e.g. Mini CEX, Case based discussions, Direct observation of practical skills*
2. Teaching
   a. *Undergraduates*
   b. *Postgraduates*
   c. *Ancillary health staff*
3. Research and Audit
   a. *Dissertation*
   b. *Research papers*
   c. *Abstracts of presentations*
   d. *Clinical Audit*
4. Ethics and Medico Legal issues
5. Information technology
   a. *Participation in training programmes/ workshops*
   b. *Evidence of searching for information and application of findings in practice*
6. Lifelong learning. Participation in conferences and meetings
7. Reflective practice

The portfolio should be maintained in separate sections to conform to the above format. Entries in the Portfolio should be made by the trainee at the time of acquiring the skill and authorized by the trainer or supervisor.

The trainee is expected to keep it updated regularly. The trainers and supervisors will use the portfolio to assess the progress of the trainee and to provide a feedback at regular intervals during the training period. The trainers and supervisors are expected to assess the level of competencies in different areas of training and provide advice and assistance to the trainees to achieve the expected levels of skills empowerment.

It is the responsibility of the trainees, the trainers and the supervisors to ensure that the entries in the Portfolio are authentic and made regularly. It is essential to provide the trainee with accurate feedback on his or her views about his or her performance during the training period.

The Board of Study expects the Trainee and the Trainers to make the best use of the Portfolio in order to achieve the objectives of the training programme. The portfolio should be kept as a ring binder document which will allow easy insertions by the Trainee.

The completed portfolio should be submitted after completion of training for the purpose of assessment. It will be assessed by a panel of three examiners appointed by the SBCTS as described later (Marking scheme in Annexure 9).

7. Training settings, units and educational resources

7.1. Local training in Cardiothoracic Surgery.

The training will be at a center recognized by the PGIM for training in Cardiothoracic Surgery. The trainer should be a Board-certified Consultant in Cardiothoracic Surgery with a minimum of three years after board certification. The training center should possess the following minimum requirements,

- Fully equipped Cardiology Unit.
- Operating facilities to perform complex Cardiothoracic Surgical procedures.
- Critical care facilities (ICU and HDU) for the patients undergoing major surgical procedures.

The trainer must provide the statistics of the unit, with his/her qualifications to the SBCTS prior to the commencement of training senior registers (Post MD) in the case of new trainer.

Facilities outside the training center (including the private sector) may be utilized by the trainer, with the approval of the SBCTS and the BOSS, solely for enhancing the training experience.

7.1.1. Training in Cardiology

The training should be in a center recognized by the PGIM with facilities for Echocardiography, Angiocardiography including intervention and Electrophysiology.

7.1.2. Training in Radiology related to Cardiothoracic Surgery

The training should be in a center recognized by the PGIM and with access to adequate facilities for HRCT and MRI.

7.1.3. Training in multidisciplinary approach in Cardiothoracic Surgical patients.

The training center should have multidisciplinary team meetings for management of Cardiothoracic patients. The multidisciplinary team should minimally consist of Consultant Cardiothoracic Surgeons, Consultant Clinical Cardiologists, Consultant Interventional Cardiologists, Consultant Anaesthetists and Consultant Intensivists. The team should meet at least once a week and discuss patient management with multimodal treatment options and investigation options.

7.1.4. Training in Clinical Perfusion.

The trainee is expected to have an adequate exposure into the field of Clinical Perfusion.

7.2. Overseas training

The training center must have a multidisciplinary approach to Cardiothoracic patient care or should be affiliated to such a center for the care of Cardiothoracic patients. The trainer and the training programme should be approved by the Specialty Board in Cardiothoracic and Thoracic Surgery.

8. Details of Trainers

The current panel of Board Approved Trainers who are Board Certified Consultants with MS/MD from the PGIM and are eligible for Privileges of Board Certification and employed in the Ministry of Health or the Universities would carry out the local training. Foreign training would be carried out by recognized Consultants in centers approved by the SBCTS/BOSS. All trainers would provide an honorary service for which no payment will be made by the University or the PGIM

9. Evaluation of Progress

9.1. The trainers should submit progress reports using the forms in Annexure 10 or Annexure 11 **every six months to SBCTS.**

9.2. The trainee with the trainer should submit completed Peer Team Rating Form **every six months to SBCTS** (for PTR forms refer the PGIM website: www.pgim.cmb.ac.lk)

10. Pre – Board Certification Assessment (PBCA)

10.1. Eligibility to sit for the PBCA

The following criteria have to be accomplished to be eligible to appear for the PBCA.

*10.1.1. Provision of satisfactory Progress Reports/PTR Reports for **ALL** stages of training.*

10.1.2. Successful completion of the case record book.

10.1.3. Successful completion of the research project and acceptance of dissertation submitted to PGIM.

10.1.4. Successful conduct and presentation of a Clinical Audit. – include as part of the portfolio.

10.2. Details of PBCA

PBCA is conducted at the end of 4 years of training. It should take the form of a final summative assessment of the trainee's portfolio, carried out by three independent examiners appointed by the SBCTS and approved by the Senate of the University of Colombo. The 3rd examiner should be from outside the discipline to improve objectivity.

The trainee will be called for an oral examination during which he/she will be questioned on the portfolio. He/she will be required to start with a presentation of 10 – 15 minutes on the post MD training.

The overall assessment should be based on each of the main sections which should be evaluated as satisfactory or not on an overall basis. The rating scales for the assessment of a portfolio are given in annexure 9. **The candidate will also have to secure a minimum of 60% in the PBCA to be eligible for Board Certification**.

10.3. Failed candidate

Board certification shall be deferred if the candidate fails the PBCA. A failed candidate will be provided with a written feedback on how the portfolio should be improved and the Board will arrange a Counseling Session. The trainee should then resubmit the portfolio within 6 months and face another oral examination based on the resubmitted portfolio. If the trainee is successful at this 2nd oral examination the date of Board Certification will not be delayed. If unsuccessful again, the date of Board certification will be the date of passing the subsequent PBCA following further training for a minimum period of six months in a unit allocated by the SBCTS.

11. Method of Delivery and Learner Support System

Text books and journal oriented knowledge, theory and practical knowledge, patient oriented discussions, cyber learning, grand ward rounds discussions and presentations at multidisciplinary meetings.

12. Recommended text books and other learning material

12.1. Textbooks

a. *Cardiac Surgery. Kirkling / Barrat Boyce*
b. *Comprehensive Surgical Management of Congenital Heart Disease. Richard Jonas*
c. *Surgery of Congenital Heart Defects. Stark , de Leval and Tsang*
d. *Atlas of Cardiac Surgery. Waldhausan*
e. *Operative Cardiac Surgery. Gardner and Spray*
f. *Adult Cardiac Surgery. Edmond and Cohn*

12.2. Journals

a. *Annals of Thoracic Surgery*
b. *European Journal of Cardiothoracic Surgery*
c. *American Journal of Cardiology*
d. *Circulation*
e. *Journal of Thoracic and Cardiovascular Surgery*
f. *Annals of* Cardiothoracic Surgery

ANNEXURE 1 - THE SYLLABUS

Overview and objectives of the Cardiothoracic Surgery Curriculum

Cardiothoracic Surgery is the specialty of medicine that deals with the diagnosis, evaluation and surgical management of diseases of the heart, lungs and chest. Cardiothoracic surgeons undertake surgical treatment of a wide range of serious conditions, and Cardiothoracic operations tend to be major and often complex procedures. Many of these operations require support from advanced forms of technology, such as cardiopulmonary bypass, invasive monitoring and minimally invasive equipment. Because of the serious nature of the conditions and the scale of the operations, many cardiothoracic patients require care in the intensive therapy unit, and cardiothoracic surgeons need to be proficient in this aspect of their patients' care too.

Cardiothoracic Surgeons generally work closely with their colleagues in Cardiology, Respiratory Medicine, Oncological Medicine, Anaesthesia and Intensive Care. They also have close professional relationships with other non-medical staff such as perfusionists, intensive care staff and operating department personnel.

Whilst many Cardiothoracic Surgeons develop proficiency in the broad range of the specialty, some tend to focus and develop expertise in more complex areas of special interest. These include:

- Cardiac Surgery
- Thoracic Surgery
- Surgery of the aorta
- Transplantation and heart failure Surgery
- Congenital Cardiac Surgery in children
- Congenital Cardiac Surgery in adults

The purpose of the training programme is to produce trained Cardiothoracic Surgeons, who will have the clinical knowledge, the surgical expertise and the professional skills necessary to practice as a consultant in Sri Lanka

These include:

- Competency in the management of patients presenting with a range of symptoms and elective conditions as specified in the core syllabus for the Specialty of Cardiothoracic Surgery.
- Competency to manage an additional range of elective and emergency conditions by virtue of appropriate training and assessment opportunities obtained during training.

- Professional competencies as specified in the syllabus and derived from the framework of Good Medical Practice of the Sri Lanka Medical Council.

The syllabus, therefore, defines the requirements of the training programme in Cardiothoracic Surgery. It identifies distinct topics within the specialty and defines the requirements or competencies within each of these areas, at each stage of training.

Within the training programme, the level of competencies are further defined in the following domains:

Knowledge: e.g. basic scientific knowledge; clinical knowledge.
Clinical skills: e.g. history, examination, data interpretation, patient management.
Technical skills and procedures: e.g. technical procedures, operative management.
Professional behavior and leadership skills: transferable or generic professional skills expected of all surgeons.

As part of the training programme the trainee will have to attain the knowledge, skills and behavior as defined in the following section of the syllabus:

Basic knowledge, skills and competencies the trainee is expected to acquire,

1. Basic Science Knowledge relevant to surgical practice

- Anatomy

a) Development and embryology
b) Gross and microscopic anatomy of the organs and other structures
c) Surface anatomy
d) Imaging anatomy

This will include detailed anatomy knowledge of Heart, Great Vessels of Thorax, Tracheo Bronchial tree, Lungs, Mediastinum, Diaphragm and Chest wall with a basic knowledge of anatomy of the rest of the body.

- Physiology - General physiological principles including

a) Homeostasis
b) Thermoregulation
c) Metabolic pathways and abnormalities
d) Blood loss and hypovolaemic shock
e) Sepsis and septic shock
f) Fluid balance and fluid replacement therapy
g) Acid base balance
h) Bleeding and coagulation

i) Nutrition

This will include the physiology of specific organ systems relevant to Cardiothoracic Surgical care including the cardiovascular, respiratory, gastrointestinal, urinary, endocrine, Haemopoetic and neurological systems.

- Pharmacology - in particular safe prescribing

The pharmacology and safe prescribing of drugs used in the treatment of surgical diseases including analgesics, antibiotics, cardiovascular drugs, antiepileptics, anticoagulants, respiratory drugs, renal drugs, drugs used for the management of endocrine disorders (including diabetes) and local/general anaesthetics.

a) Drugs used in the treatment of hypertension, heart failure and angina
b) Inotropes, vasodilators and vasoconstrictors
c) Anti-arrhythmic drugs
d) Haemostatic drugs
e) Antiplatelet, anticoagulant and thrombolytic drugs
f) Analgesics
g) Antibiotics
h) Anaesthetic agents, local and general

- Pathology - General pathological principles including,

a) Inflammation
b) Wound healing
c) Cellular injury
d) Tissue death including necrosis and apoptosis
e) Vascular disorders
f) Disorders of growth, differentiation and morphogenesis
g) Surgical immunology
h) Surgical haematology
i) Surgical biochemistry
j) Basic Pathology of neoplasia
k) Classification of tumours
l) Tumour development and growth including metastasis
m) Principles of staging and grading of cancers
n) The pathology of specific organ systems relevant to cardiothoracic surgical care

- Microbiology

a) Surgically important microorganisms including blood borne viruses
b) Soft tissue infections including cellulitis, abscesses, necrotizing fasciitis, gangrene
c) Sources of infection
d) Sepsis and septic shock

e) Asepsis and antisepsis
f) Principles of disinfection and sterilization
g) Antibiotics including prophylaxis and resistance
h) Principles of high risk patient management
i) Hospital acquired infections

- Diagnostic and interventional radiology

Principles of diagnostic and interventional imaging including x-rays, ultrasound, CT, MRI. PET, radio nucleotide scanning

2. Common surgical conditions

- To assess and initiate investigation and management of common surgical conditions which may confront any patient whilst under the care of surgeons, irrespective of their specialty.
- To have sufficient understanding of these conditions so as to know what and to whom to refer in a way that an insightful discussion may take place with colleagues whom will be involved in the definitive management of these conditions.

3. Basic surgical skills

- Surgeon's preparation for surgery,

a) Principles of hand washing, scrubbing and gowning
b) Immunization protocols for surgeons and patients

- Safe administration of appropriate local anaesthetic agents,

a) Choice of anaesthetic agent
b) Accurate and safe administration of local anaesthetic agent

- Acquisition of basic surgical skills in instrument and tissue handling
- Understanding the formation and healing of surgical wounds,

a) Classification of surgical wounds
b) Principles of wound management
c) Pathophysiology of wound healing
d) Scars and contractures

- Incise superficial tissues accurately with suitable instruments,

a) Langer's lines
b) Choice of instrument
c) Safe practice

- Close superficial tissues accurately,

a) Options for closure
b) Suture and needle choice

- Tie secure knots,

a) Range and choice of material for suture and ligation

b) Safe application of knots for surgical sutures and ligatures

- Safely use surgical diathermy
- Achieve haemostasis of superficial vessels
- Use suitable methods of retraction
- Knowledge of when to use a drain and which to choose
- Handle tissues gently with appropriate instruments
- Assist helpfully, even when the operation is not familiar
- Understand the principles of anastomosis
- Understand the principles of endoscopy

4. The principles of assessment and management of the surgical patient

- To assess the surgical patient,

a) Surgical history and examination (elective and emergency)

b) Construct a differential diagnosis

c) Plan investigations

d) Clinical decision making

e) Team work and planning

f) Case work up and evaluation; risk management

g) Active participation in clinical audit events

h) Appropriate prescribing

i) Written clinical communication skills

j) Interactive clinical communication skills: patients

k) Interactive clinical communication skills: colleagues

- To produce timely, complete and legible clinical records and procedure details.
- To assess the patient adequately prior to operation and manage any pre-operative problems appropriately.

a) Cardiorespiratory problems including Hypertension.

b) Diabetes mellitus and other relevant endocrine disorders

c) Seizures and any other Neurological implications.

d) Fluid balance and homeostasis

e) Renal failure

f) Pathophysiology of sepsis prevention and prophylaxis

g) Thromboprophylaxis and Coagulopathies.

h) Laboratory testing and imaging

i) Risk factors for surgery and scoring systems

j) Pre-medication and other preoperative prescribing

- To propose and initiate surgical or non-surgical management as appropriate.
- To take informed consent taking into consideration important social aspects like religious beliefs.

5. Peri-operative care of the surgical patient

- To assess and manage preoperative risk.
- To take part in the conduct of safe surgery in the operating theatre environment.

a) Safety in theatre including patient positioning and avoidance of nerve injuries
b) Sharps safety
c) Diathermy/ laser use
d) Infection risks
e) Radiation use and risks
f) Tourniquet use including indications, effects and complications
g) Principles of local, regional and general anaesthesia
h) Principles of invasive and non- invasive monitoring
i) Prevention of venous thrombosis
j) Surgery in hepatitis and HIV carriers
k) Fluid balance and homeostasis

- To assess and manage bleeding including the use of blood products.
- To care for the patient in the post-operative period including the assessment of common complications.

a) Cardiorespiratory management.
b) Fluid balance and homeostasis
c) Diabetes mellitus and other relevant endocrine disorders
d) Renal failure
e) Pathophysiology of blood loss
f) Pathophysiology of sepsis including SIRS and shock
g) Multi-organ dysfunction syndrome
h) Post-operative complications in general
i) Methods of postoperative analgesia
j) To assess and plan nutritional management
   i. Post-operative nutrition
   ii. Effects of malnutrition, both excess and depletion
   iii. Metabolic response to injury
   iv. Methods of screening and assessment of nutritional status
   v. Methods of enteral and parenteral nutrition
k) Haemostasis and Blood Products:
   i. Mechanism of haemostasis including the clotting cascade
   ii. Pathology of impaired haemostasis e.g. haemophilia,

iii. liver disease, massive haemorrhage
iv. Components of blood
v. Alternatives to use of blood products
vi. Principles of administration of blood products
vii. Patient safety with respect to blood products.
viii. Coagulation enhancing factors.

l) Coagulation, deep vein thrombosis and embolism:

i. Clotting mechanism (Virchow Triad)
ii. Effect of surgery and trauma on coagulation
iii. Tests for thrombophilia and other disorders of coagulation
iv. Methods of investigation for suspected thromboembolic disease and interpretation of TEG.
v. Principles of treatment of venous thrombosis and pulmonary embolism including anticoagulation
vi. Role of V/Q scanning, CT pulmonary angiography, D- dimer and thrombolysis
vii. Place of pulmonary embolectomy
viii. Prophylaxis of thromboembolism:
ix. Risk classification and management of DVT
x. Knowledge of methods of prevention of DVT, mechanical and pharmacological

m) Antibiotics:

i. Common pathogens in surgical patients
ii. Antibiotic sensitivities
iii. Antibiotic side-effects
iv. Principles of prophylaxis and treatment

n) Metabolic and endocrine disorders in relation to perioperative management

i. Pathophysiology of thyroid hormone excess and deficiency and associated risks from surgery
ii. Causes and effects of hypercalcaemia and hypocalcaemia
iii. Complications of corticosteroid therapy
iv. Causes and consequences of Steroid insufficiency
v. Complications of diabetes mellitus
vi. Causes and effects of hyponatraemia
vii. Causes and effects of hyperkalaemia and hypokalaemia

- To assess, plan and manage post-operative fluid balance

6. Assessment and early treatment of the patient with trauma

- To safely assess a patient with multiple injuries

a) General

i. Scoring systems for assessment of the injured patient
ii. Major incident triage
iii. Differences in case of children.

b) Shock

i. Pathogenesis of shock
ii. Shock and cardiovascular physiology
iii. Metabolic response to injury
iv. Adult respiratory distress syndrome
v. Indications for using uncrossmatched blood

- To safely assess and initiate management of patients with

a) traumatic skin and soft tissue injury
b) chest trauma
c) a head injury
d) a spinal cord injury
e) abdominal and urogenital trauma
f) vascular trauma
g) a single or multiple fractures or dislocations
h) burns

7. Surgical care of the paediatric patient

- To assess and manage children with surgical problems, understanding the similarities and differences from adult surgical patients.
- Surgical care of Paediatric patients with congenital heart diseases.
- To understand common issues of child protection and to take action as appropriate.

8. Management of the dying patient

- To manage the dying patient appropriately.
- To understand consent and ethical issues in patients certified DNAR (do not attempt resuscitation)
- To manage the dying patient in consultation with the palliative care team.

9. Organ and tissue transplantation

- To understand the principles of organ and tissue transplantation.
- To assess brain stem death and understand its relevance to continued life support and organ donation.

10. Professional behavior

- To provide good clinical care
- To be a good communicator
- To teach and to train
- To keep up to date and know how to analyze data
- To understand and manage people and resources within the health environment

- To promote good Health
- To understand the ethical and legal obligations of a surgeon

Detailed knowledge, skills and competencies in Cardiothoracic Surgery the trainee is expected to acquire:

- Critical Care and Postoperative Management
- Cardiopulmonary Bypass, Myocardial Protection and Circulatory Support
- Ischaemic Heart Disease
- Heart Valve Disease
- Aorto-vascular Disease
- Intrathoracic Transplantation and Surgery for Heart Failure
- Congenital Heart Disease
- Cardiothoracic Trauma
- Thoracic Surgery – General
- Neoplasms of the Lung
- Non Neoplastic disorders of Lungs.
- Disorders of the Pleura
- Disorders of the Chest Wall
- Disorders of the Diaphragm
- Disorders of the Pericardium
- Disorders of the Mediastinum
- Disorders of the Airway

1. Critical Care and Postoperative Management

The management of critically ill Cardiothoracic Surgical patients in the pre and post-operative periods

a. Cardiopulmonary resuscitation
b. Management of cardiac surgical patient
c. Management of thoracic surgical patient
d. Management of complications of surgery
e. Blood transfusion and blood products
f. Wound infection and sternal disruption
g. Neuropsychological consequences of surgery and critical care
h. Recognition, evaluation and treatment of haemodynamic abnormalities
i. Evaluation and interpretation of haemodynamic data
j. Practical use of inotropes and vasoactive drugs
k. Use of intra-aortic balloon pump
l. Recognition, evaluation and treatment of cardiac arrhythmias
m. Interpretation of ECG

n. Use of anti-arrhythmic drugs
o. Use of defibrillator
p. Understanding and use of cardiac pacing
q. Recognition, evaluation and treatment of ventilatory abnormalities
r. Interpretation of blood gas results
s. Airway management
t. Understanding of ventilatory techniques and methods
u. Understanding of anaesthetic drugs and methods
v. Recognition, evaluation and treatment of multiorgan dysfunction
w. Renal dysfunction and support
x. GIT dysfunction, feeding and nutrition
y. Recognition and evaluation of cerebral and neuropsychological problems

2. Cardiopulmonary Bypass (CPB), Myocardial Protection and Circulatory Support.

a. The management of a patient undergoing cardiopulmonary bypass

i. Principles and practice of CPB
ii. Relevant equipment and technology and their applications
iii. Monitoring during CPB
iv. Inflammatory and pathophysiological responses to CP bypass
v. Pulsatile and non-pulsatile flow
vi. Effect of CPB on pharmacokinetics
vii. Priming fluids and haemodilution
viii. Acid base balance - pH and alpha stat techniques.
ix. Neuropsychological consequences of CPB
x. Cell salvage and blood conservation
xi. Hypothermic circulatory arrest, Cerebral and Neuroprotection.

b. The management of myocardial protection during cardiac surgery

i. Scientific foundations of myocardial preservation
ii. Principles and practice of myocardial preservation
iii. Cardioplegia solutions and delivery modes.
iv. Non-cardioplegic techniques of myocardial preservation
v. Myocardial management throughout the peri-operative period
vi. Ability to adapt preservation technique to clinical situation
vii. Relevant cannulation techniques and appropriate delivery of cardioplegia solutions

c. The management of a patient requiring circulatory support

i. Mechanical circulatory support in the pre- operative, peri-operative and post-operative periods
ii. Physiology of the Intra-Aortic Balloon counter pulsation (IABP).
iii. Understanding of relevant equipment and technology for IABP.

iv. Indications for use and patient selection for IABP.
v. Insertion and positioning of the intra-aortic balloon pump
vi. Management of the balloon pump including timing and trouble shooting
vii. Care of the patient with intra-aortic balloon pump, including recognition and management of complications.
viii. Patient selection for mechanical circulatory support
ix. Ventricular assist devices (LVAD/RVAD) - indications for use, patient selection and complications
x. Indications, establishment, management, weaning off and complications of Extra Corporeal Membrane Oxygenation (ECMO)/ Extra Corporeal Life Support (ECLS).

3. Ischaemic Heart Disease

- *The assessment and management of patients with coronary artery disease, including*

i. Elective and emergency presentations.
ii. Myocardial management throughout the peri-operative period
iii. Ability to adapt preservation techniques to clinical situation.
iv. To include competencies in both primary and secondary procedures, and where appropriate to include off-pump and on-pump strategies and arterial revascularization

- *The preliminary assessment and initial management of patients with complications of myocardial infarction, including mitral regurgitation, ventricular aneurysm and septal defects. To include operative management in appropriate situations.*
- *Full competency in operative management of complex cases to be developed in the post Board Certification period*
- *Clinical Knowledge*

i. Diagnosis, investigation and treatment of heart disease
ii. Risk assessment and stratification
iii. Cardiopulmonary resuscitation
iv. Cardiac arrhythmias
v. Complications of surgery
vi. Renal dysfunction
vii. Multiorgan failure
viii. Cardiac rehabilitation
ix. Blood transfusion and blood products
x. Wound infection and sternal disruption
xi. Diagnosis investigation and assessment of IHD
xii. Operative treatment - Off pump and on pump surgery
xiii. Results of surgery - survival, graft patency, recurrence
xiv. Arterial revascularisation
xv. Redo coronary artery surgery
xvi. Role of PCI and non-operative treatment

xvii. Management of cardiovascular risk factors
xviii. Complications of myocardial infarction and ischaemic heart disease like VSD, mitral regurgitation and LV aneurysm.

- *Data Interpretation*
  i. Routine haematology and biochemical investigations
  ii. Interpretation of haemodynamic data
  iii. Chest radiograph
  iv. ECG including exercise ECG
  v. Coronary Angiography
  vi. Cardiac Catheterization data
  vii. Echocardiography including 2D,3D, Doppler, TOE and stress echo
  viii. Nuclear cardiology

- *Patient Management*
  i. Cardiopulmonary resuscitation
  ii. Diagnosis and treatment of cardiac arrhythmias
  iii. Management of post cardiac surgical patient
  iv. Management of complications of surgery
  v. Cardiac rehabilitation
  vi. Blood transfusion and use of blood products.
  vii. Wound infection, mediastinitis and sternal disruption.

- *Operative Management*
  i. Saphenous vein harvesting
  ii. Mammary artery/radial artery harvesting
  iii. Preparation for and management of cardiopulmonary bypass
  iv. Proximal coronary anastomosis
  v. Distal coronary anastomosis

4. Heart Valve Disease

The assessment and management of patients with valvular heart disease; including both isolated and combined aortic and mitral valve disease.
The assessment and management of patients with combined coronary and valvular heart disease, including operative management.

Full competence in operative management of complex cases including mitral valve repair and secondary procedures to be developed in the post Board Certification period.

- *Clinical Knowledge*
  i. Diagnosis, investigation and assessment of valvular heart disease
  ii. Timing of surgical intervention in valve disease
  iii. Indications for operative management including: Valve replacement/repair (mechanical, biological stented and stentless grafts, homografts and autografts)
  iv. Valve design: materials, configuration and biomechanics.
  v. Results of surgery – survival, valve thrombosis, endocarditis, bleeding.
  vi. Interpretation of survival and follow up data
  vii. Cardiac performance and long term functional status
  viii. Surgery for conduction problems
  ix. Surgical treatment of arrhythmias

- *Data Interpretation*
  i. Routine haematology and biochemical investigations
  ii. Interpretation of haemodynamic data
  iii. Chest radiograph
  iv. ECG interpretation including exercise ECG
  v. Coronary angiography
  vi. Cardiac catheterization data including left and right heart data
  vii. Echocardiography (thoracic and trans esophageal) including 2D, 3D, Doppler and stress echo
  viii. Nuclear cardiology

- *Patient Management*
  i. Cardiopulmonary resuscitation
  ii. Diagnosis and treatment of cardiac arrhythmias
  iii. Management of post cardiac surgical patient
  iv. Management of complications of surgery
  v. Cardiac rehabilitation
  vi. Blood transfusion and use of blood products
  vii. Wound infection and sternal disruption
  viii. Non operative management of endocarditis
  ix. Valve selection
  x. Anticoagulation management including complications

- *Operative Management*
  i. Isolated, uncomplicated aortic valve replacement (stented/stentless biological or mechanical)
  ii. Isolated uncomplicated mitral valve replacement
  iii. Tricuspid valve surgery
  iv. Combined valve and coronary artery surgery

v. Surgical strategies for managing the small aortic root
vi. Aortic root surgery including stentless valves, and root replacement
vii. Redo Valve surgery
viii. Valve surgery for endocarditis
ix. Techniques for surgical ablation of arrhythmias
x. Mitral, Aortic and Tricuspid valve repair technique.
xi. Alternative surgical approaches to valve surgery including thoracotomy, trans septal approaches, and minimal access surgery

5. Aortovascular Disease

The preliminary assessment and initial management of patients with acute dissection of the ascending aorta. To include operative management in appropriate situations.

Full competence in operative management of complex cases to be developed in the post Board Certification period

- *Clinical Knowledge*
  i. Risk assessment
  ii. Cardiopulmonary resuscitation
  iii. Cardiac arrhythmias
  iv. Complications of surgery
  v. Renal dysfunction
  vi. Multiorgan failure
  vii. Blood transfusion and use of blood products
  viii. Wound infection and sternal disruption
  ix. Natural history of aortic disease
  x. Diagnosis, investigation and assessment of aortic disease
  xi. Knowledge of operative treatment including spinal cord and cerebral preservation strategies
  xii. Type A aortic dissection
  xiii. Type B aortic dissection
  xiv. Traumatic aortic rupture
  xv. Thoraco-abdominal aneurysm
  xvi. Results of surgery – survival, complication rates
  xvii. Non-surgical management including the role of endovascular stenting
  xviii. Management of cardiovascular and non- cardiovascular risk factors

- *Data Interpretation*
  i. Routine haematology and biochemical investigations
  ii. Interpretation of haemodynamic data
  iii. Chest radiograph

iv. ECG including exercise ECG
v. Coronary Angiography
vi. Aortography
vii. Cardiac Catheterization data
viii. Echocardiography including 2D, 3D, Doppler, TOE and stress echo.
ix. CT scanning
x. MRI scanning and 3D mapping

- *Patient Management*
  i. Cardiopulmonary resuscitation
  ii. Diagnosis and treatment of cardiac arrhythmias
  iii. Management of post cardiac surgical patient
  iv. Management of complications of surgery
  v. Cardiac rehabilitation
  vi. Blood transfusion and use of blood products
  vii. Wound infection and sternal disruption.

- *Operative Management*
  i. Intraoperative monitoring
  ii. Spinal cord protection
  iii. Preparation for and management of cardiopulmonary bypass, including alternative, non-bypass strategies for descending aortic surgery
  iv. Hypothermic strategies including HCA, RCP and SACP
  v. Femoral cannulation
  vi. Surgery for acute dissection of the ascending aorta
  vii. Aortic root replacement for chronic aortic root disease
  viii. Complex aortic surgery including arch surgery, descending aortic and thoraco- abdominal aortic surgery

6. Cardiothoracic Trauma

The assessment and management of patients with minor and major cardiothoracic trauma.
To include operative management in appropriate situations.

Full competence in the operative management of complex cases including great vessel injury to be developed in the post Board Certification period

- *Clinical Knowledge*
  i. The mechanism and patterns of injury associated with blunt, penetrating, blast and deceleration injuries to the chest
  ii. The post-ATLS, definitive care of blunt, penetrating and deceleration injuries to the chest.
  iii. The indications and use of appropriate investigations in thoracic trauma management

iv. Pain relief in chest trauma, including epidural anaesthesia.
v. Indications for immediate, urgent and delayed thoracotomy in trauma

- *Patient Management*
  i. General Trauma Management
     a) Assessment and management of airway, breathing and circulation
     b) Maintenance of an adequate airway and respiratory support
     c) Protection of the cervical spine
     d) Circulatory resuscitation
     e) Establishment of appropriate monitoring
     f) *Assessment* and management of pain and anxiety

  ii. Cardiothoracic Trauma Management
     a) Examination and assessment of the of the chest, including respiratory cardiovascular and circulatory systems
     b) Recognition and management of immediately life threatening situations: obstructed airway, tension pneumothorax, massive haemothorax, open chest wound, flail chest and cardiac tamponade
     c) Recognition and management of potentially life threatening situations: lung contusion, bronchial rupture, blunt cardiac injury, intrathoracic bleeding, oesophageal injury, simple pneumothorax and major vascular injury
     d) Recognition of potentially life threatening penetrating injuries to the chest and abdomen
     e) Interpretation of chest x-ray, ECG, arterial blood gases and echocardiography
     f) Detection and treatment of cardiac arrhythmias
     g) Management of the widened mediastinum including appropriate investigations and multidisciplinary consultation

- *Operative Management*
  i. Establishment of an emergency airway (surgical and non-surgical)
  ii. Insertion and management of thoracic drains
  iii. Establish adequate venous access for therapy and monitoring.
  iv. Pericardiocentesis
  v. Subxiphoid pericardial window for tamponade
  vi. Postero-lateral, thoracotomy, antero lateral thoracotomy and thoraco-laparotomy
  vii. Bilateral Anterior Thoracotomy
  viii. Median sternotomy and closure
  ix. Repair of cardiac injuries
  x. Repair of pulmonary and bronchial injuries
  xi. Management of the complications of chest trauma including retained haemothorax and empyema

xii. Repair of oesophageal injuries
xiii. Repair of aortic transaction

7. General Management of a Patient Undergoing Thoracic Surgery.

Patient selection and determination of suitability for major thoracic surgery and pre and postoperative management of a thoracic surgical patient.

The assessment and management of a patient by bronchoscopy including foreign body retrieval
The assessment and management of a patient by mediastinal exploration
Competence in performing appropriate thoracic incisions

- *Clinical Knowledge*
  i. Thoracic Incisions
  ii. Sternotomy
  iii. Bronchoscopy
  iv. Mediastinal exploration including Mediastinoscopy.

- *Data Interpretation*
  i. Routine haematology and biochemical investigations
  ii. Chest radiograph and ECG
  iii. CT, including contrast enhanced CT
  iv. Interpretation of imaging of the mediastinum.
  v. MRI and PET
  vi. Respiratory function tests
  vii. Ventilation/perfusion scan
  viii. Blood gases

- *Patient Management*
  i. Risk assessment, stratification and management
  ii. Management of patients making an uncomplicated or complicated recovery from thoracic operations.
  iii. Post-operative management of pain control, respiratory failure, sputum retention, haemodynamic instability and low urine output.
  iv. Treatment of cardiac arrhythmias
  v. Pain control
  vi. Wound infection and wound dehiscence.
  vii. Blood transfusion and use of blood products
  viii. Physiotherapy and rehabilitation
  ix. Palliative care

- *Operative Management*
  i. Arterial cannulation
  ii. Central venous cannulation
  iii. Pulmonary artery catheterization
  iv. Tracheostomy
  v. Fibreoptic bronchoscopy
  vi. Chest aspiration
  vii. Chest drain insertion
  viii. Chest drain management
  ix. Thoracic Incisions
  x. Correct positioning of patient for thoracic surgery
  xi. Perform and repair thoracic incisions, including lateral, anterior, muscle sparing and VATS incisions.
  xii. Difficult access and improving exposure
  xiii. Perform and close sternotomy incision

8. Neoplasms of the Lung

The assessment and management of lung cancer, including the scientific basis of staging systems and techniques used in the determination of stage and fitness for surgery

- *Clinical Knowledge*
  i. Benign and malignant tumours of trachea, bronchus and lung parenchyma
  ii. Epidemiology, presentation, diagnosis, staging (pre-operative, intraoperative and pathological) and treatment of lung cancer and lung metastases.
  iii. Neoadjuvant and adjuvant treatment of lung cancer
  iv. Results of treating thoracic malignancy by surgery, medical or oncological techniques, including multimodality management.
  v. Survival, recurrence rates and relapse patterns after surgical treatment and the investigation and management of relapse.
  vi. Knowledge of palliative care techniques.
  vii. Treatment of post-operative complications of pulmonary resection such as empyema and broncho-pleural fistula.
  viii. Role of repeat surgery in recurrent and second primary malignancies of the lung.

- *Patient Management*
  i. Bronchoscopic assessment including biopsy
  ii. Endoscopic and surgical techniques of lung biopsy.
  iii. Mediastinal assessment and biopsy
  iv. Intraoperative diagnosis and staging
  v. Surgery for benign and malignant conditions of the lungs, including uncomplicated lobectomy for lung cancer, wedge resection and pneumonectomy.

vi. Segmentectomy and lobectomy for benign and malignant disease.
vii. Management of post-operative complications such as empyema and broncho-pleural fistula.

9. Non Neoplastic Lesions of Lungs.

- *Clinical Knowledge*
  i. Congenital Lung Cysts.
  ii. Bullous disease of the Lungs.
  iii. Lung abscess.
  iv. Sequestrations of lungs.
  v. Congenital Cystic Adenomatous Malformation.
  vi. Lung Hypoplasia.
  vii. Traheomalacia/Bronchomalacia.

- *Operative Management*
  i. Open procedures for uncomplicated Lung problems.
  ii. VATS procedures for uncomplicated lung problems
  iii. Management of complicated Lung problems by Open and VATS procedures.

10. Disorders of the Pleura.

The assessment and management of patients with pleural disease; including pneumothorax and empyema, and including both VATS and open strategies

- *Clinical Knowledge*
  i. Inflammatory, infective and malignant disease of the visceral and parietal pleura.
  ii. Pneumothorax
  iii. Pleural effusion
  iv. Empyema
  v. Mesothelioma
  vi. Haemothorax
  vii. Chylothorax
  viii. Conditions of adjacent organs that affect the pleura

- *Operative Management*
  i. Open procedures for uncomplicated pleural problems e.g. pneumothorax, effusion, haemothorax including drainage, biopsy, pleurodesis and pleurectomy
  ii. VATS procedures for uncomplicated pleural problems e.g. pneumothorax, effusion, haemothorax including drainage, biopsy, pleurodesis and pleurectomy
  iii. Open and VATS procedures for empyema, including techniques for decortication.
  iv. Open and VATS procedures in complex cases.
  v. Advanced techniques of pleural space obliteration.

11. Disorders of the Chest Wall.

The assessment and management of patients with chest wall abnormalities, infections and tumours.

- *Clinical Knowledge*
  i. Congenital, inflammatory, infective and neoplastic conditions that can affect the components of the chest wall.
  ii. Clinical, laboratory and imaging techniques used in the evaluation of chest wall pathology.
  iii. Techniques used in the diagnosis of chest wall disease, including aspiration and core biopsy, and incision and excision biopsy.
  iv. Pectus deformities: aetiology, physiological and psychological consequences. Surgical options for correction.
  v. Techniques used to resect the sternum and chest wall, physiological and cosmetic sequelae.
  vi. Prosthetic materials used in chest wall surgery
  vii. The role of repeat surgery to deal with recurrent conditions and the complications of previous surgery.
  viii. Techniques of complex chest wall reconstruction involving thoracoplasty or soft- tissue reconstruction

- *Patient Management*
  i. Chest wall biopsy and choice of appropriate technique.
  ii. Needle biopsy by aspiration or core techniques and the siting of open surgical biopsy.
  iii. Open and excision biopsy and resection of the chest wall for benign and malignant conditions.
  iv. Chest wall resection in combination with resection of the underlying lung.
  v. Selection and insertion of prosthetic materials, and selection of cases in which such materials are required
  vi. Pectus correction, by both open and minimally-invasive techniques, including post-operative care and complications
  vii. Surgery for the complications of chest wall resection, and repeat surgery to resect recurrent chest wall conditions.
  viii. Complex chest wall reconstruction with thoracoplasty and, with appropriate specialist support, soft tissue reconstruction

12. Disorders of the Diaphragm.

The assessment and management of patients with disorders of the diaphragm, including trauma to the diaphragm

- *Clinical Knowledge*
  i. Physiological consequences of diaphragmatic herniation or paresis.
  ii. Surgical techniques used to biopsy and resect diaphragmatic tumours.
  iii. Situations in which replacement of the diaphragm is required, the materials used and their value and limitations.
  iv. Complications of diaphragmatic resection and their management.
  v. Techniques used to electrically pace the diaphragm, and the conditions in which such treatment is appropriate.
- *Patient Management*
  i. Resection of the diaphragm, and adjacent structures, including appropriate selection and insertion of prosthetic materials
  ii. Complications of diaphragmatic resection.
  iii. Phrenic nerve pacing.

13. Disorders of the Pericardium.

The assessment and management of patients with disorders of the pericardium and pericardial cavity; including surgical management utilizing both VATS and open strategies

- *Clinical Knowledge*
  i. Anatomy of the pericardium.
  ii. Pathology of the pericardium.
  iii. Pathophysiological consequences of pericardial constriction and tamponade.
  iv. Clinical, echocardiographic and imaging techniques used to detect pericardial disease and assess its consequences.
  v. Techniques for pericardial drainage using guided needle aspiration
  vi. Surgical drainage by sub-xiphoid, thoracotomy or VATS approaches.
  vii. Surgical techniques for Pericardiostomy and pericardiectomy.
  viii. Materials used for pericardial replacement, their value and limitations and the situations in which used.
  ix. Post-operative complications following resection of the pericardium and its prosthetic replacement.

- *Patient Management*
  i. Recognition and assessment of pericardial tamponade and constriction.
  ii. Techniques for pericardial drainage using guided needle aspiration
  iii. Recognition of pericardial herniation and cardiac strangulation.

iv. Management of patients making an uncomplicated or complicated recovery from pericardial surgery.
v. Uncomplicated pericardial fenestration procedures
vi. Pericardial fenestration in complex cases.
vii. Pericardiectomy for relief of constriction
viii. Resection of the pericardium and replacement, in appropriate situations, with prosthetic materials.
ix. Competence in dealing with the complications of pericardial resection and replacement.

14. Disorders of the Mediastinum.

The assessment and management of patients with mediastinal tumours and masses; including surgical management utilizing both VATS and open strategies

- *Clinical Knowledge*
  i. Congenital, benign, infective and malignant (primary and secondary) conditions of the mediastinum.
  ii. Systemic conditions associated with the mediastinum.
  iii. Clinical, laboratory, electromyographic and imaging techniques used in the diagnosis and assessment of patients with mediastinal disease
  iv. Myasthenia gravis - medical, surgical and peri-operative management
  v. Staging of thymoma and grading of myasthenia
  vi. Benign and malignant conditions, which do not require surgical biopsy or resection.
  vii. Oncological treatment of malignant diseases of the mediastinum, including multidisciplinary care.
  viii. Surgical techniques for the treatment of myasthenia gravis, mediastinal cysts and tumours, complications and results.
  ix. Retrosternal goiter and its management

- *Patient Management*
  i. Selection of appropriate routes for biopsy and excision of mediastinal tumours and cysts.
  ii. Biopsy of mediastinal masses.
  iii. Excision of the thymus for myasthenia gravis.
  iv. Resection of mediastinal cysts and tumours masses.
  v. Resection of mediastinal cysts and tumours, including extended resections involving adjacent structures.

15. Congenital Heart Disease.

The assessment and management of patients with disorders of the major airways. Including operative management in suitable cases

- *Clinical Knowledge*
  i. Physiology
    a) Relevant general physiology of childhood
    b) Fetal circulation and circulatory changes at birth
    c) Haemodynamics; physiology and measurement including shunt calculations
    d) Physiology of pulmonary vasculature
    e) Myocardial cellular physiology in immature myocardium
    f) Electrophysiology, including conduction disorders
    g) Haemostasis, thrombosis and bleeding
    h) Acid base balance
    i) Pulmonary physiology, ventilation and gas exchange
    j) Metabolic response to trauma
    k) Vascular biology and reactivity
    l) Physiology of Cardiopulmonary Bypass including low flow and circulatory arrest.
    m) Ph. and alpha stat CPB management

  ii. Anatomy
    a) Embryology of the heart
    b) Anatomy of the heart, pericardium and great vessels
    c) Pulmonary anatomy
    d) Coronary anatomy and variants
    e) Anatomy of the peripheral vascular system and vascular conduits including aortopulmonary shunts
    f) Sequential cardiac analysis and terminology of cardiac malformations

- *Data Interpretation*
  i. Routine haematology and biochemical investigations
  ii. Chest radiograph and ECG
  iii. Cardiac catheterization data including interpretation of haemodynamic data, shunt and resistance calculations
  iv. Echocardiography in congenital heart disease, including 2D, 3D, Doppler and TOE

- *The anatomy, pathophysiology natural history and management of the following conditions or procedures*
  i. Patent ductus arteriosus
  ii. Atrial septal defect with or without Partial Anomalous Pulmonary Venous Drainage.
  iii. Ventricular septal defect
  iv. Coarctation of Aorta.
  v. PA banding and shunts
  vi. VSD
  vii. Partial and complete atrioventricular septal defects.

viii. Transposition of the great arteries and switch procedure
ix. Tetralogy of Fallot/Pulmonary atresia.
x. Fontan procedure
xi. Rastelli procedure
xii. Hypoplastic left heart syndrome.
xiii. Norwood procedure
xiv. Truncus arteriosus
xv. Double outlet right ventricle
xvi. Pulmonary atresia plus VSD and MAPCAs
xvii. Pulmonary atresia and intact septum
xviii. Single ventricle
xix. Aortic valve disease including Ross procedure
xx. Mitral valve disease
xxi. Tricuspid valve disease including Ebstiens abnormality
xxii. Extra cardiac conduits
xxiii. Interrupted aortic arch
xxiv. Total anomalous pulmonary venous drainage
xxv. Extra Corporeal Membrane Oxygenation
xxvi. Transplantation
xxvii. Hypertrophic Obstructive Cardiomyopathy.
xxviii. Coronary Artery Anomalies.

- *Operative Management*
  i. Principles of paediatric intensive care
  ii. Management of adults and children following congenital heart surgery
  iii. Management of complications of surgery
  iv. Cardiopulmonary resuscitation
  v. Diagnosis and treatment of cardiac arrhythmias
  vi. Blood transfusion and use of blood products.
  vii. Wound infection and sternal disruption
  viii. Preparation for and management of cardiopulmonary bypass including partial bypass
  ix. Approaches for ECMO, cannulation and management.
  x. Surgical management of the following common uncomplicated conditions:
    a) *Patent ductus arteriosus*
    b) *Atrial septal defect*
    c) *Ventricular septal defect*
    d) *Coarctation of Aorta.*
    e) *PA banding and shunt*

ANNEXURE 2 - FORMAT FOR DETAILED PROJECT PROPOSAL

Section 1

Name of trainee
Name(s) of supervisor(s)
Training Centre

Section 2

Project title
Background and justification
Objectives of study
Research plan
Design
Setting
Method
Sample size and sampling techniques
Outcome measures
Statistical analyses and plan of presentation of results
Ethical considerations
Work plan and time lines
References
Funding for study
Signature of trainee

Section 3

Recommendation of supervisor(s)

Signature of Supervisor 1 Signature of Supervisor 2

Date Date

Section 4

Date of submission to PGIM

Date of approval by SBCTS

Signature of Secretary SBCTS

ANNEXURE 3 - REPORT OF THE RESEARCH PROJECT REVIEWER

Name of Trainee:
Training Centre:
Supervisor:
Reviewer:
Name:
Designation
Address Official:
Tel//Fax:
Email:
Title of Project:

Please comment on each of the following headings.

Introduction: Rationale (Justification) – problem identified and quantified. Hypothesis and expected outcome, impact and relevance of the study.

Comment: …….

Literature Review: Adequacy (evidence of a systematic search for related. similar, relevant studies)

Comment: ……..

Objectives: Clearly defined. Relevant and stated in measurable terms.

Comment: ……..

Method: Appropriate study design to address the objectives with clear detailed description of subjects, sampling technique and sample size, interventions, data collection and management. The study should be, internally valid and reproducible. Where specific details are available in the literature, reference should be made to the original papers, and comments kept to a minimum. If modifications have been made to the published techniques, these should be described in full. Appropriate statistical tests planned should be mentioned and ethical issues addressed

Comment: ……..

Results: Order of presentation and appropriate presentation of tables, figures, graphs. Appropriate statistical analyses and interpretations

Comment: ……..

Discussion: The findings of the study should be discussed taking into consideration findings of relevant studies, within and outside the country. The discussion should not be a repetition of the results only. Limitations should be included.

Comment: ……

Conclusion and recommendation: Based of the results of the study and to address the objectives

Comment: ……

Limitations: Any inherent and / or inadvertent biases and how they were dealt with.

Comment: ……

References: According to the Vancouver system and relevant to the study. Properly documented in the Bibliography and appropriately cited in the text

Comment: ……

Ethical considerations/institution from where ethical approval will be /has been obtained:

Comment: ……

Overall presentation: Overall presentation of the proposal (grammar, spelling, typographical mistakes etc.

Comment: ……

Recommendation of reviewer:

Comment: ……

Is the dissertation acceptable? Yes / No

If No, What corrections are required? (Attach a separate sheet of paper if necessary)

Signature: **Date:**

Recommendation of the SBCTS:

Signature of Chairperson/Secretary: **Date:**

ANNEXURE 4 - INSTRUCTIONS TO DISSERTATION SUPERVISORS

The post MD dissertation for Cardiothoracic Surgery is based on a 1-2 year research project. Acceptance of the dissertation is a mandatory requirement for Pre Board Certification Assessment.

The trainee should write up the project work as a dissertation conforming to the format approved by the Specialty Board in Cardiothoracic and Thoracic Surgery.

The supervisor should guide the trainee in planning and designing, carrying out the research and in presentation of the work.

The supervisor should forward Progress Report(s) in the prescribed form at every 6 months after the trainee commences work on the research project.

The objective of the dissertation is to prove the trainee's capability to plan, carry out and present his / her own research. The purpose of this training is to ensure maturity, discipline and scholarship in research.

The dissertation should comprise the trainee's own account of his / her research.

It must contribute to existing knowledge of Cardiothoracic problems relevant to Sri Lanka and abroad, evidence of originality as shown by independent, critical assessment and / or discovery of new facts in the area under study.

It should be satisfactory as regards literary presentation.

The dissertation should be certified by the supervisor as suitable for submission.

General Comments on the contents:
The objectives should be clearly stated and should be feasible to achieve within the time frame. Other published work relevant to the problem (both international and local) should be comprehensively covered and critically evaluated. An appropriate study design and method should be used to achieve the objectives stated. The results should be appropriately analyzed, interpreted and presented effectively. The discussion should include comments on the significance of results, how they agree or differ from published work. If they differ, the probable reasons for these differences need to be discussed. Theoretical / practical applications of the results, if any should be given. The conclusions should be valid and be based on the results obtained on the study.

Ethics:
The candidate should confirm and document that procedures followed were approved by the Ethical Committee of the institution where the work was carried out and ethical approval was obtained by a recognized Ethical Review Committee.

The trainee is encouraged to make a short (10 min.) presentation of the project proposal in the year 1 post MD training to obtain a feedback from other trainers and invitees, regarding feasibility, appropriateness of study design and method and statistical considerations, prior to commencement of the project.

Prior to submission of the dissertation, it would be better if the trainee makes a short (15 – 20 minutes) presentation of the project, to the SBCTS members and other invitees. This will give the trainee an opportunity to discuss his / her work and obtain a feedback from peers and colleagues. It will not be used for evaluation in any form. The supervisors could also be invited for these presentations.

The trainee will be questioned on the dissertation at the viva-voce examination.

If at any time the supervisor is not satisfied with the work progress of the trainee, the trainee should be made aware of the deficiencies and corrective measures suggested. This should be conveyed in writing to the trainee with a copy to the SBCTS. In such instances, a follow-up report should be forwarded within three months or earlier if necessary to the SBCTS.

ANNEXURE 5 - DISSERTATION PROGRESS REPORT

To be forwarded by the supervisor to the SBCTS at least once in SIX months.

Name of trainee:
Training Centre: Supervisor:
Title of project:

Description of work carried out to date:

(To be filled in by trainee: briefly describe progress in lab / field work and dissertation writing)

Supervisor's comments

Is the work on schedule? Yes / No

Progress in dissertation writing: Satisfactory / Unsatisfactory

Constraints (if any)

Recommendation of supervisor:

Signature: Date:

Recommendation of the SBCTS:

Signature of Secretary : Date:

ANNEXURE 6 - DISSERTATION SUBMISSION FORMAT

General instructions

It is essential to start writing the dissertation early and in all cases before the data collection is completed. At the same time, you should make arrangements to have your manuscript word-processed. Your supervisor should be consulted before you start to write and thereafter at regular intervals. It is much easier to make corrections if the draft is double-spaced and printed on only one side of the paper.

The past tense should be used. To avoid exceeding the given word limit, it is suggested that an approximate running total is kept. The metric system and the International System (SI) of units should be used.

Length

An ideal length of text is approximately 8000 words, which equals to about 20 - 30 pages. With figures, references, etc. the total length is likely to be in the region of 30 - 40 pages.

Number of copies

Three copies should be submitted to the Director/ PGIM, spiral-bound in the first instance. One will be retained in the PGIM, the other two will be sent to the examiners nominated by the SBCTS for that purpose. After acceptance (and necessary corrections), all three copies should be bound in hard covers (black) with the author's name, qualifications and year printed in gold on the spine. The front cover should carry the title, author's name and year printed in gold. One copy will be returned to the trainee, one retained by the supervisor, and the third will be housed in the PGIM library.

Layout

The dissertation should be word-processed and printed single-side only, on A4-size photocopying paper.

<u>Layout of typescript</u>

There should be 1.5" on left-hand and top margins, and 1.0" on right-hand and bottom margins.
It is especially important that the left-hand (binding) margin is of the regulatory size.
Line spacing should not be less than 1.5.
Lettering should be in Times New Roman, font size 12.
All pages should be numbered consecutively throughout, including appendices.
Page numbers should be inserted in the bottom right hand corner.

Tables, diagrams, maps and figures

Wherever possible, these should be placed near the appropriate text. Tables should be numbered in continuous sequence throughout the dissertation. Maps, graphs, photographs, etc., should be referred to as Figures. Each of these should also be numbered in a continuous sequence. Colour should be avoided in graphic illustrations (unless it is essential) because of the difficulty of photographic reproduction; symbols or other alternatives should be used instead.

Notes

Notes, if essential, should be inserted, in reduced font, at the foot of the relevant page. If too voluminous for this to be practicable, they should be placed in an Appendix. Notes may be typed in single spacing.

Abbreviations

Where abbreviations are used, a key should be provided

Preliminaries

The preliminaries precede the text. They should comprise the following:

Title page
Title of dissertation
Author's name
Qualifications
Post Graduate Institute of Medicine
University of Colombo
Date of submission

Statement of originality:

The work presented in the dissertation should be the trainee's own and no part of the dissertation should have been submitted earlier or concurrently for any other degree. The statement should be signed by the author, and countersigned by the supervisor.

Abstract:

Should be structured (introduction, objectives, method, results, conclusions). Should not include figures, tables, graphs or references. It should be limited to 500 words or less.

Table of contents:

The table of contents immediately follows the abstract and lists in sequence, with page numbers, all relevant divisions of the dissertation, including the preliminary pages.

List of tables:

This lists the tables in the order in which they occur in the text, with the page numbers.

List of figures:
This lists all illustrative material (maps, figures, graphs, photographs etc.) in the order in which they occur in the text, with the page numbers.

Acknowledgments

Text
The dissertation should be divided into clearly defined chapters. Chapters may be subdivided and a decimal number system can be helpful to identify sections and subsections. Topics of the sections should not be mixed, e.g. Results should not appear in the Materials and Methods.

Section 1 – Introduction:
The current position and the reasons for carrying out the present work (Rationale /Justification and problem/s identified and quantified.) Hypothesis and expected outcome, impact and relevance of the study should be stated. Generally, only a few references should be cited here.

Section 2 – Literature Review:
This section should be reasonably comprehensive, and most of the references to be quoted normally occur here. The relevant references dealing with the general problems should be reviewed first and this should be followed by a detailed review of the specific problem. The review in many cases approached as a historical record of the development of knowledge of the subject.

Section 3 – Objectives
Clearly defined, general, specific and any subsidiary objectives should be stated

Section 4 – Materials and Methods:
Appropriate study design to address the objectives with clear detailed description of subjects, sampling technique and sample size, interventions, data collection and management. The study should be, internally valid and reproducible. Where specific details are available in the literature, reference should be made to the original papers, and comments kept to a minimum. If modifications have been made to the published techniques, these should be described in full. Appropriate statistical tests planned should be mentioned and ethical issues addressed

Section 5 – Results:
Presentation of data in a logical sequence commencing with the basic / baseline characteristics of the subjects. Summarize the data with figures, tables or graphs, when appropriate present statistical analyses and interpretations. Each figure, table or graph should be complete and clear without reference to the text. Concise explanations in legends and explanation of abbreviations are needed. The text should complement the figures, tables or graphs not simply describing them

but giving valid interpretations of the results. Complete (raw) data should not be included but should be contained in tables in an Appendix if needed. Only data from the present study should be included and in particular no comparison should be made at this stage with results from other studies.

Section 6 – Discussion:

Interpret and explain the results so as to provide answers to the study question(s). Comment on the relevance of these answers to the present knowledge of the subject. Consider alternate interpretations. Comment on interesting or unexpected observations and about the method. Critically compare the results with results and conclusions of other published studies within and outside the country, and explain possible reasons for any differences observed. Comment on unexpected outcomes and on further follow-up research required on the subject.

Section 7- Limitations:

Any inherent and / or inadvertent limitations / biases and how they were dealt with should be described

Section 8- Conclusions and recommendations:

Based on the results of the study and to address the objectives

References

These are given so that the reader can refer to the original papers for further study. Uniformity is essential, but errors and inconsistencies are very common and authors are advised to check the references most carefully. Examiners will mark students down for inconsistencies in their references, either omissions or failure to follow the recommended format may be marked negatively.

All literature referred to should be listed in a consistent form and style, and must contain sufficient information to enable the reader to identify and retrieve them

There are different styles of citing sources, listing references and compiling a bibliography. The Vancouver style is widely accepted in scientific writings, and is recommended for Cardiothoracic Surgery dissertation. List all references that are cited in the text, using the Vancouver System

Type the references double - spaced in the Vancouver style (using superscript numbers and listing full references at the end of the paper in the numerical order in which they appear in the text). Online citations should include date of access. Use Index Medicus for journal names. If necessary, cite personal communications in the text but do not include in the reference list. Unpublished work should not be included. References should be listed in the following style:

The order of the items in each reference should be:

For journal references:
Surname Initial(s). Title of article. Journal title/or title abbreviation. Year; volume (issue): page(s). DOI - if available

For book references:
Surname Initial(s). Book title. Edition - if available. Place of publication: Publisher; Year.

For Anthology references:
An anthology is a book with one editor, but where the chapters are written by several different authors.

Surname author Initial(s). Chapter title. In: Surname editor Initial(s), editor(s). Book title. Place of publication: Publisher; Year. page(s).

Authors' names should be in roman letters, and arranged thus:
Smith, C.O., James, D.E., Frank, J.D.

Where an author's name is repeated in the next reference it should also be spelt out in full.

The title of the paper is then included, without quotation marks. The journal title should be unabbreviated, *in italics*, and be followed by year; **volume number in bold** (the issue /number): and the first and last page numbers.

Buxton, B. F. Complete arterial grafting for coronary artery disease. *The Journal of Thoracic and Cardiovascular Surgery.* 2003; **125 (4**): 782-783.

For Website References:
Author's name (if available) must be listed first, followed by the full title of the document in italics, Publisher, the date of publication or last revision (if available), the full http address (URL) and the date accessed in parentheses

ANNEXURE 7 - DISSERTATION MARKING SCHEME

The two examiners appointed by the SBCTS shall use the following marking grid to allocate marks for the dissertation.

1. Title	02
2. Author's name and address	02
3. Abstract	06
4. Table of contents	04
5. List of tables and figures	04
6. Introduction	06
7. Objectives	06
8. Review of literature	08
9. Materials and methods	08
10. Results	10
11. Discussion (including limitations)	14
12. Conclusion and recommendations (if any)	12
13. Acknowledgements	02
14. References (Vancouver system should be used)	08
15. The overall presentation	08

Two examiners will be appointed by the SBCTS to assess and award a mark independently out of 100 using the marking system described above. The final mark for the dissertation out of 200 shall be the total of the marks given by each examiner.

To Pass the Dissertation the trainee should score 60 % or more. If it is less than 60% the trainee should resubmit the Dissertation at a prescribed date attending to the recommended amendments and improvements for reassessment by the same pair of examiners.

ANNEXURE 8 - THE PORTFOLIO

POSTGRADUATE INSTITUTE OF MEDICINE

UNIVERSITY OF COLOMBO

SRI LANKA

TRAINING PORTFOLIO - SECTION 2 (POST MD)

LOG OF CLINICAL ACTIVITIES

BOARD CERTIFICATION IN

CARDIOTHORACIC SURGERY

2015

Specialty Board in Cardiothoracic Surgery

The Board of Study in Surgery

Post Graduate Course Conducted by Board of Study in Surgery for Cardiothoracic Surgery
Post Graduate Institute of Medicine, University of Colombo

Training Portfolio - Section II (Post MD)

Introduction

Candidates who are successful at the MD (Surgery) Part II Examination and if they select Cardiothoracic Surgery they will have to complete a total 48 month period in-service training: a 24 month period in Sri Lanka as a Senior Registrar and another 24 month period at center/centers of excellence abroad. During this 48 month period, the trainee has to document the progress of his/her training and maintain a comprehensive record in the form of a Training Portfolio. This will enable the Trainee to reflect on his training experience and identify and correct any weaknesses in the competencies expected from him, and also recognize and analyze any significant clinical events experienced, so that appropriate changes in management could be adopted in order to reduce the risks arising from such situations in the future. The Trainer needs to conduct regular assessments and certify that the Trainee has satisfactorily acquired the necessary competencies. This Training Portfolio will be used to evaluate the trainee's competence to practice independently as a Specialist in Cardiothoracic Surgery at the Pre Board Certification Assessment.

Objectives

To be appointed as a Specialist in Cardiothoracic Surgery to practice independently in Sri Lanka, on completion of the 48 month period in-service training after the MD (Surgery) Part II Examination, the Trainee should:

i. Have administrative and organizational skills.
ii. Be able to clearly document and prioritize problems
iii. Have skills appropriate to a specialist (diagnostic, operative, counseling, risk management, management of medico-legal issues).
iv. Have appropriate attitudes.
v. Be able to carry out and also supervise research and clinical audits
vi. Be committed to Continuous Professional Development.
vii. Be able to disseminate knowledge effectively.
viii. Have adequate knowledge of the English Language and be able to communicate effectively.
ix. Have adequate knowledge and skills in Information Technology

COMPONENTS OF THE PORTFOLIO

1. **Subject expertise.**
    a. Progress reports from supervisors.
    b. Log of procedures carried out.
    c. Results of any workplace assessments.
    d. Professional Development. e.g. Mini CEX, Case based discussions, Direct observation of practical skills.
2. **Teaching.**
    a. Undergraduates.
    b. Postgraduates.
    c. Ancillary health staff.
3. **Research and Audit.**
    a. Dissertation.
    b. Research papers.
    c. Abstracts of presentations.
    d. Clinical Audit
4. **Ethics and Medico Legal issues.**
5. **Information technology.**
    a. Participation in training programmes/ workshops.
    b. Evidence of searching for information and application of findings in practice.
6. **Lifelong learning.**
    a. Participation in conferences and meetings.
7. **Reflective practice.**

LOG OF SURGICAL PROCEDURES PERFORMED INDEPENDENTLY/PERFORMED WITH ASSISTANCE/ASSISTED/OBSERVED.

Trainee should document the procedures on a book, using the given headings. At the end of the training programme the trainee should have performed independently the procedures highlighted in bold letters. The minimum number of cases the trainee should have done/attended is stated within brackets.

Procedure,

1. General Cardiothoracic Surgical procedures
   - **a. Chest drainage tube insertion. (25)**
   - **b. Chest drainage tube removal. (25)**
   - **c. Sternotomy for cardiac surgical procedures. (50)**
   - d. Antero lateral thoracotomy. (10)
   - **e. Postero lateral thoracotomy. (25)**
   - **f. Mediastinotomy. (10)**
   - **g. Closure of sternotomy. (50)**
   - **h. Closure of thoracotomy. (25)**
   - i. Re do sternotomy. (10)
   - j. Femoral arterial cannulation. (10)
   - k. Femoral venous canulation. (10)

2. Adult Cardiac Surgical procedures.
   - **a. Aortic cannulation, venous cannulation and establishing cardio pulmonary bypass. (100)**
   - **b. Weaning off cardiopulmonary bypass and decannulation. (100)**
   - **c. Harvesting of long saphenous vein. (50)**
   - **d. Harvesting of Internal Mammary Artery. (50)**
   - **e. Harvesting of Radial Artery. (25)**
   - **f. Valve replacements Mechanical**
     Mitral Valve. (10)
     Aortic valve. (10)
   - **g. Valve replacements Biological Stented/Stentless**
     Mitral Valve. (05)
     Aortic Valve. (05)
   - h. Valve repair techniques
     Mitral Valve. (25)
     Aortic Valve. (10)
     Tricuspid valve. (25)
   - **i. Coronary Artery Bypass procedures, On pump/Off pump**
     Top end anastomosis. (25)
     Bottom end anastomosis. (25)

j. Surgery for complications of Ischaemic Heart Disease
   Ischaemic VSD. (05)
   Ischaemic Mitral Regurgitation. (05)
   Ventricular Aneurysm. (05)
k. Repair of Aortic Aneurysm, Dissected/Non Dissected. (05)
l. Pericardial Procedures.
   Pericardiostomy. (05)
   Pericardiectomy. (02)
   Pleuro Pericardial Window. (05)

3. Paediatric Cardiac Surgical Procedures.
a. Aortic and Venous Cannulation. (10)
b. Aortic and Venous Decannulation. (10)
c. Closure of ASD.
   Secondum. (20)
   Primum. (05)
   Sinus Venosus with/without PAPVD. (05)
d. Closure of VSD. (02)
e. Repair of AV Canal defect. (05)
f. Surgery for Tetralogy of Fallot and its variants.
   Total correction. (10)
   Total correction with Trans annular Patch. (02)
   Rastelli Procedure. (02)
g. Surgery for Total Anomalous Pulmonary Venous Drainage. (05)
h. Ligation/Division of PDA. (05)
i. Arterial Switch Operation. (05)
j. Surgery of Aortic Arch
   Coarctation of Aorta. (05)
   Interrupted Aortic Arch. (02)
k. Palliative Procedures.
   Pulmonary Artery Banding. (05)
   BT Shunt. (10)
   Glenn Shunt. (02)
l. Fontan Procedure. (02)

4. Thoracic Surgical procedures
a. Decortication of Lung. (05)
b. Lobectomy of Lung. (05)
c. Pneumonectomy. (05)
d. Pleural Biopsy. (05)
e. Lung Biopsy. (05)
f. Video Assisted Thoracoscopy. (05)

5. Procedures important in the Management of Cardiac and Thoracic Surgical Patients.
   a. **Femoral/ Radial line insertion for Invasive BP monitoring. (10)**
   b. **CVP line insertion. (10)**
   c. **IABP catheter insertion. (20)**
   d. **Endotracheal Intubation. (10)**

6. Thoracic Trauma. (10)
   a. **Surgery for Haemothorax.**
   b. **Surgery for Cardiac Tamponade.**

*** The trainees are expected to observe, assist or personally perform the above procedures. If the trainee could not achieve the adequate number, it is the responsibility of both trainee and trainer that arrangements are made for the trainee to go to a center where he can obtain the relevant experience prior to completion of the local training. The SBCTS assessment committee will evaluate the trainees log book for the adequacy of Cardiothoracic Surgical Procedures before the trainee leave for overseas training.**

SURGICAL PROCEDURES PERFORMED INDEPENDENTLY, ASSISTED OR OBSERVED (SKILL LEVEL 3) – (EXAMPLE)

01. Adult Cardiac Surgery.

No	Name	Age	Surgery	BHT No / Hospital	Observed/ Assisted/ Performed	Date of Surgery	Signature of Supervisor
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

PROFESSIONAL DEVELOPMENT

	Comments	Review Date	Signature of Trainer
Responsibility and initiativeness			
Reliability regarding patient Care			
Team work ability			
Leadership skills			
Communication and rapport with patients			
Communication with colleagues			
Relationship with the other professionals			
Documentation and organizational skills			
Issuing signed certificates			
Written communications			
Participation in SLCS Activities & hands on workshops			

GUIDELINES FOR TRAINEES ON ASSESSMENT OF PROFESSIONAL DEVELOPMENT

Assessment of Generic skills (administration, documentation, attitudes),

Trainers should always accentuate the positive comments and have a critical yet constructive approach for progression.

Mini Clinical Evaluation Exercises (mini-CEX)

The Trainer observes and assesses the Trainee directly, during the process of history taking, Clinical examination, formulating management plans and communicating with Patients. Results should be informed and discussed immediately after the assessment.

Case-based Discussions

Hypothetical case discussions with Trainees.

1. Relevant to knowledge criteria and competences
2. Assess clinical decision making, knowledge and application of knowledge.
3. Each case-based discussion should involve slightly different clinical situations in the area to be tested.
4. Discussion should focus on the information that would be given to the patient and recorded in the notes

Objective Structured Assessment of Technical Skills

The Trainer observes and assesses the Trainee directly, when the Trainee is carrying out a procedure
A pre-determined format (which will vary depending on the procedure) will be used for the assessment

Review of Progress by the Trainer

The Trainers should conduct reviews of the Trainee's progress after there (3), nine (9), fifteen (15) and eighteen (18) months of the training period.

During these reviews the trainee's specific strengths and areas which need improvement should be identified.

1. **Review after three months**

Strengths : ……
Areas for improvement : ……
General comments : ……
Signature of Trainer : ……
Date : ……

2. **Review after nine months**

Strengths : ……
Areas for improvement : ……
General comments : ……
Signature of Trainer : ……
Date : ……

3. **Review after fifteen months**

Strengths : ……
Areas for improvement : ……
General comments : ……
Signature of Trainer : ……
Date : ……

4. **Review after eighteen months**

Strengths : ……
Areas for improvement : ……
General comments : ……
Signature of Trainer : ……
Date : ……

LECTURES/TEACHING (Undergraduates / Postgraduates/Ancillary Staff)

	Date	Signature of Trainer
Teaching a Small Group (< 10) Undergraduate. Postgraduate Ancillary Staff		
Teaching a Large group (> 20) Undergraduate Postgraduate Ancillary Staff		
Bed- side Clinical Teaching		
Teaching Practical Procedure **(One to one / small group)**		
Organization of Teaching **Seminars/Workshops**		

RESEARCH, AUDIT, CLINICAL RISK MANAGEMENT & GOVERNANCE

	Comments	Review Date	Signature of Trainer
Ability to Assist, Monitor and Supervise a Research Project			
Scientific writing			
Critically Appraise a Scientific Paper			
Perform an Audit			
Prepare or Revise a Guideline or Care- pathway			
Organizing Risk Management Meetings			
Oral Presentations / Guest lectures at Local / Regional / National or International Conferences			

ETHICS AND MEDICO LEGAL ISSUES

Following topics should be addressed and documented in the portfolio.

1. Consent
2. Next of kin issues
3. Divulging of information
4. Breaking bad news
5. Management of dying patient
6. Conflicts with colleagues

INFORMATION TECHNOLOGY

	Date accessed	Date reviewed by the Trainer	Signature of Trainer
Use of computer software			
Use of Internet, World Wide Web and E mail			
Literature Search using PubMed Cochrane Data Base WHO-RHL Google Others - specify			

REFLECTIVE PRACTICE

Learning to reflect on and learn from difficult clinical situations in which you have been directly involved, is a vital part of continuous professional development in being a good doctor. This is an integral part of clinical risk management which requires the recognition and analysis of significant clinical situations so that appropriate changes in management could be adopted to reduce the risks arising from such situations in the future. Reflective practice enables you to describe what happened and why, justify or identify any possible lapses in your management, what you have learnt from this experience and, most importantly, what you would do differently next time, considering best available evidence.

Use the reflective practice format to document and analyze relevant clinical scenarios. In addition to this, whenever you are involved in a difficult clinical situation, record the event and your thoughts about it in the reflective practice format. Discuss as soon as possible with your Trainer at least four such clinical events that you think you should reflect on, especially cases that has been particularly distressing for you. You may need to examine previously held beliefs about your practice and accept that you may have been wrong and therefore need to change your practice. This process will help you to recognize and learn from prior experiences and improve your clinical practice. It is your responsibility to gather and record the material required for this process. The material you record will demonstrate your ability to maintain good continuous professional development by using every learning opportunity to be a reflective self-directed learner. Each clinical event you reflect on will be evaluated by your trainer.

REFLECTIVE PRACTICE DOCUMENTATION – (Guidelines to trainee)

Describe the management of the selected case:

What problems did you see and observe?

What did you do?

Justification for what you did:

What did you learn from this experience?

What is done differently in other clinical units: local and foreign?

What would you do differently next time?

Evidence for suggesting these changes:

Has this experience highlighted any deficiencies in your training?

What learning needs did you identify from above?

Have you addressed these learning needs? If so How?

Summary of discussion with Trainer:

Comments of the trainer:

Comments of the trainee:

Assessment: mark/grade

Signature of Trainer: Signature of Trainee:

Date:

Comments of the External Assessors:

Date:

SUMMARY OF TASKS

Audits- 1

Research projects- 1

Lectures to Medical Students / Doctors - 5

Attending specialized training away from place of work- 3

Writing Reports 2

Reflective practice Four (4) significant clinical events which you think are important for you to reflect.

Journal clubs **2**

CME Article discussion **2**

Clinico - Pathology meetings **3**

Workshops – attendance **4**

With regard to the above mentioned tasks the trainees are expected to carry out at least the number stated above. They can be carried out during the local or the overseas component of the training period.

ANNEXURE 9 - FORMATIVE ASSESSMENT OF THE PORTFOLIO

1. **Documentation: Clarity, Brevity, Correct sequence, Focused presentation**

	Marks/10
Fail	4 or less
Borderline	5
Pass	6
Good pass	7
Excellent pass	8 or more

2. **Subject expertise: Progress reports, Surgical competency (log book), Professional Development**

	Marks/10
Fail	4 or less
Borderline	5
Pass	6
Good pass	7
Excellent pass	8 or more

3. **Teaching: Undergraduate, Postgraduate, Ancillary Staff**

	Marks/10
Fail	4 or less
Borderline	5
Pass	6
Good pass	7
Excellent pass	8 or more

4. Other Activities: Research, Audit, IT, Ethics and Medico Legal issues.

	Marks/10
Fail	4 or less
Borderline	5
Pass	6
Good pass	7
Excellent pass	8 or more

5. Reflective Practice

		Marks/10
Fail	Has not completed Reflective cycle	4 or less
Borderline	Has only described the learning experience	5
Pass	Analyzed the reasons for the experience & the reasons for outcome	6
Good pass	Evaluated how the outcome could have been different if a different course of action was taken	7
Excellent pass	Provided high quality evidence for implementing changes	8 or more

Total Mark out of 50 - Examiner 1 =

Total Mark out of 50 - Examiner 2 =

Total Mark out of 50 – Examiner 3 =

Mark out of 100 =

Signature of Examiner 1: ……..

Signature of Examiner 2: ……..

Signature of Examiner 3: ……

Date: …../……/……

ANNEXURE 10 - FORMAT FOR PROGRESS REPORT ON TRAINEES

NAME OF TRAINEE:
PERIOD OF TRAINING:
SPECIALTY:
HOSPITAL AND UNIT:
COUNTRY:
NAME OF THE CONSULTANT:

	Excellent	Good	Average	Poor
Theoretical knowledge				
Clinical decision making				
Clinical skills				
Operative skills				
Ability to cope with emergencies & complications				
Think independently & rationally				
Seek appropriate consultations				
Ability to follow instructions				
Quality of documentation				
Dedication to work				
Professional attitudes				
Reliability				
Availability/punctuality				
Communication skills				
Doctor-patient relationship				
Relationship with colleagues				
Relationship with other staff				
Supervises & help juniors				
Teaching of medical students/junior staff				

Other Comments:

ANNEXURE 11 - FORMAT FOR PROGRESS REPORT- OVERSEAS APPOINTMENT

NAME OF TRAINEE:
PERIOD OF TRAINING:
SPECIALTY: HOSPITAL AND UNIT:
COUNTRY:
NAME OF THE CONSULTANT:

	Excellent	Good	Average	Poor
Theoretical knowledge				
Participation in Educational Activities (Seminars/ workshops/ Journal club/ Clinical meetings)				
Research interest				
Clinical decision making				
Clinical skills				
Operative skills				
Ability to cope with emergencies & complications				
Think independently & rationally				
Seek appropriate consultations				
Ability to follow instructions				
Quality of documentation				
Dedication to work				
Professional attitudes				
Reliability				
Availability/punctuality				
Communication skills				
Doctor-patient relationship				
Relationship with colleagues				
Relationship with other staff				
Supervises & help juniors				
Teaching of medical students/junior staff				

Other Comments: