A. TRAINING PROGRAM GOALS

The purpose of an invasive and interventional cardiovascular training program is to prepare its trainees to function at a competent level of performance in invasive diagnostic and interventional cardiovascular procedures as part of comprehensive patient care. The overall goal has three components:

1. To understand the indications and limitations of cardiovascular diagnostic and interventional procedures in order to select patients and procedure types appropriately.
2. To achieve the proper cognitive knowledge and technical skills needed to perform diagnostic and interventional cardiovascular procedures at a level of quality attainable through the present state of the art.
3. To foster an attitude of life long learning, commit to quality assessment and improvement in procedure performance and follow up.

B. FACULTY

An ideal training program is staffed by a faculty with the expertise and commitment required to provide an optimal educational and training experience. The minimum faculty complement is two, with the additional proviso that a program should have no more than a ratio of 1.5 trainees per faculty member. The faculty should consist of a Program Director and other associated faculty.

Program Director. The program director is responsible for the policy development, program operation, trainee and faculty supervision and trainee evaluation. The program director should be board certified. He should have a career experience of at least 5 years after completion of training, including an aggregate experience of at least 500 coronary / non-coronary diagnostic and interventional procedures (after his training.) The program director should be a fellow of the Philippine College of Cardiology and a Fellow of the Philippine Society of Cardiac Catheterization and Intervention Inc.

Other faculty. The faculty is charged with responsibility of the Cardiac Catheterization Laboratory’s teaching & training activities. Faculty should be board certified and have
a career experience of at least 200 coronary and non-coronary procedures (after training).

C. FACILITIES AND ENVIRONMENT

C1. General facilities. An invasive and interventional cardiovascular training program must be an integral component of a comprehensive cardiovascular disease training program. On-site capabilities must include cardiovascular critical care units and cardiac surgery, and ideally, nuclear cardiology and clinical electrophysiology.

C2. Patient mix. A trainee in invasive and interventional cardiology should be exposed to a full spectrum of cardiac ischemic syndromes, congenital heart diseases, valvular heart disease, and peripheral vascular diseases. The trainee must also acquire significant experience in the management of patients who require circulatory support.

C3. Program procedure volume: In order to provide a comprehensive experience for its trainee/trainees, a program must perform a requisite number of coronary and non coronary procedures per year. The laboratory must have at least 500 procedures per year or per training program duration to allow maximum exposure for the trainee. The program volume should be able to allow a trainee to perform a minimum of 200 procedures as primary operator (50 of which should be interventions)

D. TRAINING PROGRAM

D1. Admission requirements
1. Satisfactorily completed three (3) years of fellowship training in adult cardiology in a PCP/ PCC accredited institution.
2. Must have accumulated at least four (4) months cumulative rotation in the hemodynamics laboratory during cardiology fellowship
3. Satisfactorily pass the screening criteria set by the Catheterization Laboratory

D2. Positions available
The number of positions available will be dependent on the volume load of the laboratory. To qualify for a training program, the laboratory should have a minimum caseload ratio of 500 cases: 1 trainee.

D3. Description of training program

D3.1 Clinical Conferences
The training program should conduct a weekly invasive cardiology conference; the purpose of which would be to review and critique both diagnostic and interventional cases with respect to case selection procedure conduct and outcome. This conference should review and discuss all adverse outcomes that occur within the training program. A didactic curriculum should also be included to ensure that trainees acquire the required cognitive knowledge base. The trainee must also participate in the regular conferences of the integral comprehensive cardiology training program of the institution, and should exert effort in imparting knowledge regarding invasive cardiology to the general cardiology trainees.

D3.2 Interventional Core Curriculum
A body of basic information underpins the practice of cardiac catheterization and interventional cardiology. Understanding it is integral to determining procedure appropriateness, case selection, technique selection, procedure conduct and adjunctive therapy selection. Consequently training solely in the technical aspects of performing procedures is inadequate. A training program must ensure that its trainees acquire the requisite cognitive knowledge base.

Synopsis of the important topics basic to cardiac catheterization and interventional cardiology:

1. Anatomy. Cardiac, vascular and coronary artery anatomy including anatomic variants and congenital abnormalities.

2. Physiology. Circulatory physiology, coronary vascular physiology, myocardial blood flow regulation, myocardial physiology and metabolism.


5. Pharmacology. Anticoagulation, antiplatelet drugs, thrombolytic drugs, x-ray contrast
agent, myocardial inotropes, vasopressors, vasodilators, antiarrhythmic drugs and drugs affecting lipid metabolism


7. Clinical management strategies. Performance and limitation of interventional devices, spectrum of coronary ischemic syndromes, result of interventional cardiology trials, management of acute hemodynamic alterations and mechanical and pharmacological circulatory support.

This cognitive knowledge base is also linked to the technical aspect of performing procedures. A training program must have its own strategy to ensure that trainees receive a comprehensive didactic education as outlined in the synopsis. This can be accomplished through either a program of supervised study or didactic seminars and conferences.

D3.3 Clinical Skills
1. The trainee must be familiar with all the indications, applications and contraindications of diagnostic and therapeutic procedures performed in the catheterization laboratory.
2. Trainee must fully understand and apply hemodynamic equations and correlate findings with the pathophysiology of the cardiovascular condition.
3. Trainee must be able to interpret angiographic findings in relation to cardiovascular disease.
4. The trainee must be able to arrive at a feasible clinical/surgical/interventional approach or solution to problems presented after evaluating gathered invasive diagnostic data.
5. The trainee must fully understand and apply the pre procedural routines, intra and post procedural protocols of the various invasive diagnostic and therapeutic procedures.

D3.4 Procedural Skills
1. Trainees will be exposed to various procedures involving adult congenital, valvular, coronary, pericardial and peripheral vascular disease. The trainee will learn the different materials and equipment used in diagnostic and interventional cardiology.

2. Trainees will participate as primary assistants to invasive cardiology consultants in elective or emergency diagnostic and interventional procedures performed on their private cases. The trainee will perform their own procedures on adult service cases or private cases (with consent of consultants) as primary operator under the direct supervision of a faculty member.

3. Specific procedures. A comprehensive training program may offer a core experience in the following diagnostic and interventional techniques:
   • Diagnostic
     a. Percutaneous vascular access via:
        i. Femoral vein/artery
        ii. Jugular vein
        iii. Subclavian vein
        iv. Radial artery
        v. Brachial artery
     b. Coronary angiography
     c. Ventriculography
     d. Hemodynamic studies in the following
        i. Congenital disease
        ii. Valvular disease
        iii. Pericardial diseases
        iv. Primary myocardial diseases
     e. Peripheral angiography
     f. Invasive ultrasonography (optional)
     g. Myocardial biopsy (optional)
     h. Trans-septal catheterization
   • Therapeutic / Interventions
     1. Conventional balloon angioplasty
     2. Coronary artery stenting
     3. Primary angioplasty for acute myocardial infarction
     4. Atherectomy technique (optional)
     5. Intra-aortic balloon counter-pulsation and other techniques of mechanical circulatory support
     6. Balloon valvuloplasty
     7. Peripheral interventions
D3.5 Duration of Training:
Training in cardiac catheterization and interventional cardiology must be carried out as an extra 1-2 years after completing the three year training period in adult cardiology. The extra year is dedicated purely to performing cardiac catheterization and interventional procedures. Preceptorship and on-the-job training are no longer recognized as viable methods of training. During the 12-24 months training period, the trainee is expected to have performed a total of 200 procedures, 50 of which are interventions.

D3.6 Evaluation of Trainee
1. Trainee will log in all cases in which he/she has personally assisted or performed a procedure on as primary operator which must be counterchecked by the consultants concerned. The trainee must maintain a detailed record in a logbook of all procedures performed in the laboratory. The documentation must include patient's identity, procedure performed, assisting physician, procedure outcome and complications (if any). Each trainee should be able to perform as primary operator a minimum of 200 coronary and non-coronary procedures including 50 interventions (PCI, valvuloplasty, peripheral intervention).

2. Evaluation of technical skills must be carried out by direct supervision of the trainee during the performance of the procedures. Evaluation of responsibilities includes assessment of thoroughness of pre-procedural evaluation and clinical follow-up, reliability and interpersonal interaction with patients, other physicians and laboratory staff.

3. Invasive cardiology faculty will submit their evaluation of each trainee to the program director based on the following parameters
   i. Adequate knowledge and familiarity with the clinical background of the case he / she is performing.
   ii. In-depth knowledge of the procedure being performed (indications, contraindications, complications, specific plan of approach)
   iii. Familiarity with and proper implementation of the standard pre-procedural, intra-procedural and post-procedural protocols of the cardiac catheterization laboratory.
   iv. Proficiency, dexterity and skill in assisting or performing diagnostic or intervention procedure
   v. Research output

4. The training program director and or training officer, aided by evaluation inputs from other faculty, will be responsible in attesting whether a trainee has achieved the requisite cognitive knowledge and has acquired the necessary technical skills to be recommended as independent operator and thus graduate from the program.