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160 Prof. Nandadasa Kodagoda Mawatha, Colombo 7, Sri Lanka.**

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**POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO**

Prospectus

Board Certification in Interventional Radiology

(To be effective from the year 2016)

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1. Introduction

Interventional Radiology (IR) is a subspecialty of radiology in which minimally invasive procedures are performed using image guidance to treat many vascular and non-vascular diseases.

The fact that most of the procedures can be done under local anaesthesia makes it an attractive option when general anaesthesia carries risks due to patient's co morbid conditions.

The minimally invasive nature of the procedures reduces patient morbidity compared to surgical procedures, shortening the hospital stay, especially in ICU. Consequent lowering of health budget makes the procedures more cost effective.

Interventional Radiology has to be practised by Radiologists trained in diagnostic radiology as it involves image interpretation. An Interventional Radiologist is expected to develop competency in safe and effective practice of many complex invasive therapeutic procedures extending into all branches of radiology. Therefore a comprehensive understanding of core knowledge in general radiology is an essential pre requisite.

Large numbers of Interventional Radiology procedures are done using ionising radiation for image guidance. Only radiologists have a comprehensive training in radiation hazards and radiation protection which make them the most suitable and eligible to practise these procedures considering safety of patients, staff and public.

Training in Interventional Radiology has to include General Interventional Radiology excluding interventional Neuroradiology procedures (IR) and Interventional Neuroradiology (INR).

2. Eligibility for entry into training programme

- a. Successful completion of MD Radiology examination held immediately before the allocation meeting.
- b. Trainee should not be previously Board Certified by the PGIM in any speciality or subspecialty

3. Selection process

Initial selection is by order of merit in the MD Radiology examination of the relevant year and trainee's preference for the subspecialty.

As this is a subspecialty requiring a high level of skills, selected trainee/s should have a preliminary training of four weeks with a trainer in IR. To enter the training programme, satisfactory appraisal report by the trainer in IR will be essential. Format for this appraisal is included in [Annex 1](#)

If not selected, this four weeks shall be counted as a part of the trainee's post MD local training.

If the first trainee is not selected for IR at the end of preliminary training of four weeks, the opportunity is given to the other trainees according to the order of merit.

4. Number to be selected for training

Available training opportunities will be indicated by the PGIM in the public circular for the Radiology MD examination. The number of candidates will be predetermined and approved each year by the Board of Study in Radiology (BOSR) in consultation with the Ministry of Health.

5. Outcomes, competences and learning objectives

5.1 Outcomes

Expected outcome of this training programme is to provide knowledge, skills and attitudes specifically required to practice as competent Interventional Radiologists to fulfill the health service needs and demands of Sri Lanka.

5.1.1 Learning outcomes:

At the end of the training programme the trainee should have developed

- a. The necessary practical skills to perform key interventional procedures independently.
- b. A professional attitude and good conduct towards all aspects of clinical practice leading to improvement of patient care.
- c. An ability for proper decision making using practical application of knowledge.
- d. Capability of functioning as the leader of IR team and as a responsible member of MDT.
- e. An interest for continuing medical education and research.
- f. A healthy outlook for allowing accurate self-assessment and learning from experience.

5.2 Competencies

These are considered in two broad groups as **General competencies** and **Competencies Specific to Interventional Radiology**.

5.2.1 General competencies

It is expected of the trainee to have gained knowledge in the following areas during the pre-MD training period and in post MD local rotation components.

i. **Basic sciences relevant to IR**

Knowledge in Anatomy, Pathophysiology, and Epidemiology of disease processes commonly encountered in IR.

Diagnosis of a disease process and its therapeutic options.

Trainee should be familiar with Pharmacology, Anaesthesia and sedation relevant to IR procedures.

ii. **Imaging relevant to IR**

The trainee should have a good understanding of the role of various imaging modalities in the diagnosis and management of diseases.

Thorough knowledge and skilful performance of vascular Imaging procedures i.e. Doppler US, MRA, CTA, DSA is essential.

- iii. Patient care in IR**
Importance of peri-procedural care, effective management of complications and short term and long term patient follow-up should be learnt.
- iv. Competency in minor surgical procedures**
Trainee should be able to carry out minor surgical procedures such as suturing skin wounds, cut down procedures and fixing of drainage tubes to skin.
- v. Radiation protection**
As IR Consultant is the main officer responsible for radiation protection in the Unit, satisfactory understanding of radiation protection measures to shield patient, staff and public is essential.
- vi. Legal issues and Documentation in IR**
Trainee should be aware of medico-legal aspects pertaining to IR. e.g. obtaining informed written consent.
Trainee should practise to maintain detailed records pertaining to all procedures.
- vii. Managing an IR Unit**
Trainee should learn how to manage an IR Unit effectively utilizing resources in order to deliver satisfactory patient care.
- viii. Quality assurance**
Trainee should learn the importance and methodology of continuous quality assurance process in an IR Unit.

5.2.2 Competencies Specific to Interventional Radiology

These are the technical skills the trainee should develop with regard to Vascular Intervention procedures and Non Vascular Intervention procedures.

- Demonstrate learning of the topic specific educational objectives.
- Understand proper patient selection and therapeutic options for the interventional procedures described below.
- Understand pre-procedure evaluation and post procedure management and follow-up for these procedures and patients.
- Demonstrate technical competence in the performance of these procedures.

6. Structure of training programme

The training programme consists of all non-vascular and vascular radiology guided interventional procedures including Neuro-interventions.

6.1 Training for Interventional Radiology (IR)

This is conducted over a total period of 36 months and consists of six stages.

- | | |
|---|---------|
| Stage I – Post MD training in IR on probation | 4 weeks |
| Stage II- Post MD training in Non-invasive vascular imaging i.e. | |
| Doppler US | 2 weeks |
| CTA | 2 weeks |
| MRA | 2 weeks |
| Stage III - Rotations in non-Radiology specialties relevant to Interventional Radiology | |
| Oncology unit | 2 weeks |
| Clinical Neurology | 4 weeks |
| Neurosurgery Unit+ Neuro ICU | 4 weeks |
| A & E Unit + ICU | 2 weeks |
| Oro Maxillo Facial surgery Unit | 2 weeks |
- Stage IV Training in IR in Sri Lanka (18 months)
- a) 12 months of General Interventional Radiology (excluding neuro-interventional procedures)
 - b) 06 months of Interventional Neuroradiology
- Stage V Training in IR Overseas (12 months)
- a) 6 months of Interventional Radiology
 - b) 6 months of Interventional Neuroradiology
- Stage VI Pre Board Certification Assessment.

After completion of all stages I to V of the training programme, stage VI Pre Board Certification assessment shall be held.

A trainee who passes the Pre-Board Certification Assessment and fulfil other requirements of the PGIM shall be eligible to be recommended for the board certification as a Specialist in Interventional Radiology.

6.2 Leave during the training period

Leave during the training period is governed by the general rules and regulations of the PGIM. Such absence should be notified to the BOSR.

7. Content areas

The content areas on which trainees are expected to gain expertise are included as [annex 2](#).

8. Learning activities

Learning activities that trainees are expected to engage in, apart from routine service in the training unit include the following.

- a. Apprenticeship type of training. Trainees shall follow a systematic full time practice based training programme
- b. Self-directed learning
- c. Regular meetings with other units / departments
- d. Participation in Continuing Medical Education activities
- e. Participation in international meetings in IR
- f. Conduct of audits
- g. Conducting a research project. Details of procedures for obtaining approval for the project, carrying it out and submitting the report are given in [annex 3](#).
- h. Engagement in the teaching and training of undergraduate and postgraduate students
- i. Maintaining a reflective portfolio. Format and other details are included in [annex 4](#)

9. Trainers and training units

9.1 Designated Trainer

Consultant Radiologists with at least 3 years of experience after Board Certification in General Radiology and who were subsequently appointed as Interventional Radiologists by the Ministry of Health and following which have undergone at least continuous 6 months training in IR at a centre overseas, approved by the Board of study in Radiology and Ministry of Health, will be appointed as trainers. **Duties and responsibilities of a Trainer are outlined in [annex 5](#).**

9.2 Accredited Training Units

The training shall be conducted in training centres recognized by the Board of Study in Radiology as suitable for training in IR and INR. Recognition of training centres will be guided by criteria laid down by BOS in Radiology and PGIM, availability of facilities and clinical material for training at the centre and presence of trainers at these centres.

Accreditation of training centres has to be done periodically according to the regulations laid down by the BOSR and PGIM ([annex 6](#)).

10. Monitoring progress

Assessing and monitoring the performance and continuing professional development of trainee during and after the completion of training improve the calibre of the trainee. This in turn will serve as a measure of improving the training programme.

10.1 Tools Used for Trainee Evaluation

- Evaluation of Procedural Experience, Practice – based learning and improvement, direct observation of procedures (DOPS) see [annex 7](#).
- Peer team ratings ([annex 8](#))
- Research/ Audits
- Periodic appraisal of detailed log book records, case records, and Post MD Record Book which should be parts of the reflective training portfolio

- Progress reports from local and overseas Trainers ([annex 9](#) and [annex10](#))

10.2 Eligibility for final assessment and Pre Board Certification Assessment

Trainees should have fulfilled the following conditions before they can apply for the final assessment.

- i. Provision of satisfactory Progress Reports for ALL stages of training.
- ii. Successful completion of the research report or publication of the Research findings
- iii. Successful conduct and presentation of the two Clinical Audits
- iv. Submitted the duly completed portfolio

10.2 Final Assessment

The final appraisal will take the form of an examination consisting of two components:

A) Film Packet Reporting (FPR).

5 film packets.

Duration – 15 minutes for each film packet

Each packet will be marked by two independent examiners.

B) A Viva Voce Examination conducted by a panel of two examiners.

Duration - 30 minutes. 15 minutes will be allocated for each examiner.

The examiners would be appointed by the BOSR according to the rules and regulations laid down by the PGIM.

Allocation of marks

Film Packet Reporting	- 100 marks
Viva Voce Examination	- 100 marks
TOTAL	- 200 marks

10.3 Pass mark

The candidate should obtain a minimum of 50% of the total 200 marks and secure a minimum of 50% in each of components (A) and (B), in order to be eligible for the Pre Board Certification Assessment (PBCA).

A failed candidate would need to attend a counselling session within two weeks of the assessment and sit for the final assessment again within a period of three months. The candidate would need to repeat only the component/s in which he or she failed.

If unsuccessful at the second attempt, the trainee will have to undergo further training for a minimum period of six months in a unit allocated by the BOSR before subsequent attempts at the final assessment.

11. Format of Pre Board Certification Assessment (PBCA)

After successful completion of the final assessment, all trainees should go through a Pre-Board Certification Assessment (PBCA).

11.1 Assessment tool

The PBCA should be based on assessment of the reflective training portfolio maintained by the trainee during the period of post-MD training.

The PBCA should take the form of a final, summative assessment of the trainee's portfolio, carried out by two independent examiners (one of whom should be from outside the discipline to improve objectivity) appointed by the BOSR and approved by the Senate of the University of Colombo.

The trainee should be called for an oral examination, during which he/she will be questioned on the portfolio. The trainee shall be required to start with a 15 minutes presentation, on the post-MD training.

The overall assessment should be based on each of the main sections of the portfolio, which should be assessed as follows:

Excellent (5), Very good (4), Pass (3), Borderline (2), Fail (1)

If the overall grade obtained is borderline or fail, the examiners must provide the trainee with written feedback on how the portfolio should be improved in order to reach the required standard. The trainee should then re-submit the portfolio within a period of three months and face another assessment based on the re-submitted portfolio.

On successful completion at the second attempt, the date of Board Certification shall be backdated according to PGIM general regulations and guidelines.

If unsuccessful at the second attempt, the trainee will have to undergo further training for a minimum period of six months in a unit allocated by the BOSR and improve in the deficient areas in the portfolio before sitting for the PBCA again.

If successful at third or subsequent attempt, the date of Board Certification will be determined according to the PGIM general regulations and guidelines.

12. Board Certification

A trainee who has successfully completed the Pre-Board Certification Assessment with a grade of pass or above is eligible for Board Certification as a Specialist in Interventional Radiology on the recommendation of the Board of Study in Radiology.

The date of board certification shall be determined by the general rules and regulations of the PGIM.

13. Recommended Books/Journals for reading

Recommended Books/Journals for reading are given in [annex 11](#).

Annex1. Format for the appraisal after four weeks of probation in IR

Checklist for the Appraisal of the Preliminary Four Week training in Interventional Radiology

(Please tick the appropriate cage for each item)

A. Knowledge

1. Basic Sciences (Anatomy, Pharmacology, Pathophysiology and Epidemiology) related to disease commonly encountered in interventional radiology

Satisfactory Unsatisfactory Not Assessed

2. Conditions treated by Endo Vascular procedures

Satisfactory Unsatisfactory Not Assessed

3. Importance of total care of the patient (peri-procedural care, post procedural care, effective management of complications and follow up)

Satisfactory Unsatisfactory Not Assessed

4. Role of various imaging modalities in the diagnosis and management of diseases

Satisfactory Unsatisfactory Not Assessed

Please provide details if any of the items are rated as unsatisfactory

.....
.....
.....

B. Skills

1. Competency in minor surgical procedures such as suturing skin wounds, cut down procedures and fixing of drainage tubes to skin

Satisfactory Unsatisfactory Not Assessed

2. Adherence to radiation protection measures

Satisfactory Unsatisfactory Not Assessed

3. Record keeping

Satisfactory Unsatisfactory Not Assessed

4. Communication skills

Satisfactory Unsatisfactory Not Assessed

Please provide details if any of the items are rated as unsatisfactory

.....
.....
.....

C. Professionalism and Attitudes

1. Work ethics

Satisfactory Unsatisfactory Not Assessed

2. Attitude towards team work

Satisfactory Unsatisfactory Not Assessed

3. Punctuality

Satisfactory Unsatisfactory Not Assessed

4. Commitments towards life-long learning

Satisfactory Unsatisfactory Not Assessed

Please provide details if any of the items are rated as unsatisfactory

.....
.....
.....

Overall Performance (Judged based on above criteria)

Satisfactory Unsatisfactory

Please provide reasons if the overall rating is unsatisfactory

.....
.....
.....

Name of the Supervisor..... Signature.....

Date:

Guidelines on Trainee appraisal

1. The appraisal has to be done by two independent raters who have observed the performance of the trainee. In case of any discrepancy, a consensus needs to be arrived at.
2. This checklist has 3 domains (knowledge, skills, attitudes and professionalism). Each domain has 4 items. All items should be rated.
3. If any of the items are rated as unsatisfactory, the trainee need to be counselled and appropriately guided.
4. If the overall performance is rated as unsatisfactory, the suitability of the trainee to follow the programme needs to be reconsidered.

Annex2 The content areas

This annex contains

2a. Syllabus for Interventional Radiology

2b. Syllabus for Interventional Neuroradiology training

2a. Syllabus for Interventional Radiology

General Topics in Interventional Radiology

Patient Care

Proper patient care is mandatory for safe procedure. Trainees must learn to assess and manage patients before, during and after the procedure.

Appropriate selection of patients for IR procedures

Proper evaluation of patient

Identification of risk factors

Obtain informed consent after reviewing the procedure with the patient

Effective communication with patient, family and staff

Ability to recognize and treat any complications occurring before, during or after the procedure

Pharmacology of Interventional Radiology

Trainee should learn the indications, contraindications, interactions and side effects of the pharmacological agents commonly used in Interventional Radiology, including

- i. Aetiology, prevention and treatment of contrast reactions
- ii. Local anaesthetics
- iii. Analgesics
- iv. Sedatives
- v. Vasoactive drugs
- vi. Drugs affecting coagulation
- vii. Drugs used in diabetes
- viii. Antibiotics
- ix. Antiemetics
- x. Management of circulatory collapse
- xi. Management/ pharmacology of cardiorespiratory arrest

NON-INVASIVE VASCULAR IMAGING

The trainee should gain a thorough understanding and be able to interpret the following:

Doppler Ultrasound

CT Angiography

MR Angiography (MRA)

DIAGNOSTIC ANGIOGRAPHY/ VENOGRAPHY

Vascular interventional radiologists encounter a wide range of conditions affecting almost every organ system and affecting both arteries and veins.

Trainees must appreciate and be familiar with

The role of the different imaging modalities in the assessment of vascular disease
The scope of vascular interventional radiology and other medical and surgical strategies for the management and treatment of arterial and venous disease

Arterial Puncture Technique

The trainee should have a thorough knowledge of:

- i. Standard groin anatomy, including the position of the inguinal ligament and the femoral nerve, artery and vein
- ii. Seldinger technique of arterial and venous puncture
- iii. Mechanisms for guide wire, sheath and catheter insertions into the groin
- iv. Mechanisms of puncture site haemostasis including manual compression and common closure devices
- v. Alternative sites of arterial puncture

Diagnostic Angiography

The trainee should be familiar with:

- i. Guide wires, sheaths and catheters used for common diagnostic angiographic procedures
- ii. Digital subtraction angiographic techniques, bolus chase techniques, road mapping and pixel shift techniques
- iii. Standard arterial and venous anatomy and variations in anatomy throughout the body
- iv. Peripheral vascular angiography
- v. Mesenteric and renal angiography
- vi. Abdominal aortography
- vii. Thoracic aortography
- viii. Carotid, vertebral and subclavian angiography
- ix. Diagnosis of atherosclerotic disease, vasculitis aneurismal disease, thrombosis, embolism and other vascular pathology
- x. The complication rates for common diagnostic procedures
- xi. Post-procedural care regimens for standard diagnostic vascular procedures

Arterial Disease

Aortic and Upper Extremity Arterial Disease

Peripheral Arterial Disease

Atherosclerosis
Diabetic foot syndrome
Embolus
Vasculitis
Fibro-muscular Dysplasia

Vascular Trauma

Active extravasation, pseudo-aneurysm, arterio-venous fistula, arterial transection, traumatic occlusion, intimal flap, and intramural haematoma

Aortic Dissection aneurysmal disease

Entrapment Syndromes

Neoplastic Disease

Vascular graft

Visceral Arterial Pathology

Gastrointestinal Haemorrhage
Visceral Artery Aneurysms
Visceral and Gastrointestinal Tumours
Bronchial and Pulmonary Arteries
Arterial Problems in Obstetrics and Gynaecology
Vascular Interventional Oncology
Vascular Management of Hepatic Malignancy

Technical Skills

- Demonstrate ability to plan optimal vascular access
- Demonstrate technical competence of puncture site management
- Be able to categorise arterial lesions according to the expected outcome e.g.
 - Technical success
 - Complications
 - Clinical outcome
 - Restenosis
- Demonstrate technical competence in the performance of vascular interventions including Recanalization techniques
 - Balloon angioplasty and stent placement
 - Thrombolysis
 - Management of complications
- Demonstrate correct selection and use of equipment including:
 - Guidewires

- Catheters
- Sheaths
- Balloons
- Embolic materials
- Stents-grafts
- Demonstrate competence in planning stent-grafts using cross sectional imaging on a high quality workstation
- Demonstrate competence in the techniques of endovascular repair of aortic aneurysms or dissections, including:
 - Pre-/peri-procedural trans - catheter occlusion of significant branch vessels
 - Preparation, insertion and deployment of the current aortic stent-graft devices
 - Post-deployment manoeuvres required to safely remove the device introducer and close the access site
- Understand the role of intravascular pressure gradients including the use of vasodilators to assess the outcome of vascular interventions
- Differentiate between embolic occlusion and in situ thrombosis in cases of acute limb ischemia and tailor therapy accordingly
- Demonstrate ability to recognise and manage the potential complications of endovascular procedures such as balloon angioplasty, stenting, stent grafting and thrombolysis
- Understand the indications, contraindications and limitations of puncture site closure devices
- Recognise the role of emerging treatments for restenosis including
 - Pharmacology
 - Brachytherapy

Cerebrovascular Accident/Stroke

Knowledge

- Know the intracerebral arterial anatomy
- Understand the pathophysiology of ischaemic CVA/stroke
- Know the most important risk factors for ischaemic CVA/stroke

Clinical Skills

- Recognise and be able to elicit the basic neurological symptoms and signs caused by acute stroke
- Know the differences between a stroke event in the posterior and anterior circulation
- Know the most commonly used neurological classifications/scores (NIHSS; modified Ranking score)
- Be familiar with non-invasive stroke imaging (CT/CTA; MR/MRA; Diffusion-Perfusion imaging)
- Be familiar with the “penumbra-concept”
- Know and understand the indications and contra-indications of intervention
- Understand the indications for trans-arterial stroke treatment
- Be familiar with the factors which strongly influence the indication for stroke treatment (Time window; findings in non-contrast enhanced CT; collateral flow)
- Have knowledge of the most important drugs used in the acute and post-acute phase (Aspirin, Clopidogrel, others)
- Understand the role of and be able to interpret post interventional imaging (CT; MR)
- Know about timing of follow-up examinations
- Understand the most commonly used scales for angiographic outcome (TICI score)

- Understand the problems of clinical outcome (i.e. discrepancy between angiographic and clinical outcome)
- Be familiar with the most up-to-date literature on this topic

Technical Skills

- Demonstrate competence in performing intra-arterial thrombolysis
- Be familiar with the materials needed for trans-arterial thrombectomy (i.e. selection of guiding catheters, microcatheters, microguidewires)
- Know the most commonly used thrombectomy devices (stent-retrievers, hydrodynamic devices)
- Demonstrate competence in performing a thrombectomy procedure
- Know the potential risks and complications (dissection; perforation, thrombus dislodgement) and their management

Abnormal Arteriovenous Communications

Knowledge

- Know how to classify vascular malformations according to their clinical presentation and natural history. Understand the difference between endothelial proliferative disorders (haemangioma) and developmental lesions - arteriovenous malformations (AVM), low flow and lymphatic malformations
- Understand various classification schemes for vascular malformations
- Understand the role of interventional radiology and its place in the multidisciplinary team

Clinical Skills

- Be able to evaluate patients and categorise lesions as either high-flow or low-flow based on history, physical examination and imaging findings
- Be able to arrange and interpret appropriate imaging studies to evaluate the extent and nature of vascular malformations. Understand that invasive vascular studies are rarely required in assessment
- Understand the typical MR appearances of low-flow and high flow malformations
- Understand the need for multidisciplinary management of patients with vascular malformations
- Understand the indication, contra-indications and complications of IR procedures
- Recognise the clinical presentation of congenital haemangioma and understand the limited role of intervention in this condition
- Recognise the clinical presentation of lymphatic malformation and understand treatment options
- Recognise the clinical presentation of patients with low-flow vascular malformations and the indications for treatment and the possible complications
- Understand the clinical presentation of patients with high-flow vascular malformations and the indications for treatment and the possible complications
- Understand when patients with vascular malformations should be referred to large centres with concentrated experience in treating these patients
- Know syndromes in which a vascular malformation is part of the clinical features e.g.
- Klippel-Trenaunay syndrome, hereditary haemorrhagic telangiectasia, Kasabach-Merritt syndrome. Understand the likely imaging findings

Technical Skills

- Demonstrate competence and understanding of the principles and agents used in treatment of high-flow vascular malformations
- Demonstrate competence in the techniques for treating high flow malformations e.g. direct injection of the nidus, use of tourniquets or balloon occlusion
- Demonstrate competence in managing complications of treatment of high-flow vascular malformations
- Demonstrate competence and understanding of the principles, agents and techniques used in treatment of low-flow vascular malformations
- Demonstrate competence in managing complications of treatment of low-flow vascular malformations

Venous Disorders

- Peripheral venous disease including deep venous thrombosis,
- Varicose veins treatment by Endo venous Laser ablation
- Pulmonary Thromboembolic disease
- Superior and Inferior Vena Cava disease
- Portal and Hepatic venous interventions
- Gonadal venous interventions
- Central venous access
- Venous sampling

Knowledge

- Normal venous anatomy and major anatomic variants of clinical importance
- Epidemiology and haemodynamics
- Pathophysiology

Clinical Skills

Eliciting appropriate clinical history, perform physical examination

Select and interpret appropriate laboratory and imaging investigations

Understanding of various treatment options

- Demonstrate a fundamental knowledge of chronic liver disease and its clinical manifestations
- Integrate patient clinical information into a classification scheme such as the Childs-Pugh score and MELD score.
- Demonstrate a fundamental knowledge of portal hypertension, including its clinical manifestations, and potential complications including ascites, hepatic hydrothorax, gastro-oesophageal varices, portal gastropathy, hepato-renal syndrome, and hepatic encephalopathy.
- Know the role of balloon dilation and stent placement in the management of extrahepatic vein stenosis
- Know the clinical success rates, patency rates, and complication rates reported for TIPS in current medical literature, including data comparing TIPS to endoscopic and surgical treatment options
- Understand the role of TIPS in patients being considered for liver transplantation

- Understand the role of variceal embolization in patients undergoing TIPS for variceal bleeding
- Understand the potential advantages and limitations of various medical and surgical treatment options available for managing portal hypertension and its complications. This includes medical management, endoscopic interventions, and surgical by-pass procedures for patients with gastro-oesophageal bleeding

Technical Skills

Competence in common percutaneous therapies such as laser, radiofrequency ablation and foam sclerotherapy and avoidance of complications

- range of interventional equipment including guidewires, catheters, balloons, permanent and optional IVC filters, embolic materials, TIPS sets and trans-hepatic cannulation kits
- Demonstrate technical competence in the performance of femoral and jugular venous access, pulmonary angiography, pulmonary thrombolysis and mechanical thrombectomy, inferior vena cavography, IVC filter placement and retrieval of IVC filters
- Demonstrate technical competence in the performance of SVC and IVCO treatment, including venous access, thrombolysis, balloon dilatation and stent placement
- Demonstrate technical competence in the performance of all procedural aspects of PVE, for ipsilateral and contralateral trans-hepatic approaches
- Be familiar with the interventional equipment including guidewires, sheaths, catheters, balloons and various types of stents
- Have knowledge of, and competence in, the techniques of placement of a number of different tunneled haemodialysis catheters, arm and chest wall ports
- Be competent in snare retrieval of intra-vascular catheter fragments
- Know the range, maximum flow rates and maximum pressures of central venous catheters, ports, PICCs, dialysis and apheresis lines

NON VASCULAR INTERVENTION

Image-Guided Biopsy

Knowledge

Have detailed knowledge of the anatomy relevant to the site of biopsy

Clinical skills

Describe advantages and disadvantages of various imaging modalities in guiding biopsy of the chest, neck, abdomen, pelvis and musculoskeletal system

Appropriately manage pre-procedure work-up including appropriate laboratory values

Identify alternatives to percutaneous biopsy where suitable e.g. EUS (endoscopic ultrasound)guided biopsy for pancreatic and subcarinal masses

Indications and contraindications for transthoracic needle biopsy

Recognize which lesions are best diagnosed and/or approached with fine needle aspiration versus core biopsy and when and how to send the material for microbiological evaluation if infection is suspected

Technical skills

Demonstrate competence in safely performing percutaneous biopsy of lesions in the chest, abdomen and pelvis

Be familiar with a variety of biopsy needles and techniques including the use of CT fluoroscopy and various targeting technologies for difficult lesions

Recognize patients at risk for post biopsy pneumothorax and apply techniques to reduce this risk if applicable

Be able to treat patients with post biopsy pneumothorax including conservative management or placement of a chest drain if necessary

Be familiar with how to treat patients with significant haemorrhage following biopsy

Image-Guided Aspiration and Drainage of Collections and Abscesses

Knowledge

Know the anatomy of the relevant organs, pleural and peritoneal spaces, and significant anatomical variants and adjacent structures pertinent to:

Understanding disease processes

Planning interventional strategies

Minimizing, recognizing and managing complications

Assessing evolution of the collection after percutaneous drainage

Understand the epidemiology of diseases associated with fluid collections and abscesses sufficient to aid diagnosis, understand disease progression and inform outcomes of interventions

Be aware of intestinal perforations, focal infections (primary and secondary), acute pancreatitis, acute cholecystitis, and post-operative surgical complications

Understand the pathophysiology, evolution and the timing/indication for drainage of fluid collections

Clinical Skills

Assess appropriate laboratory investigations confirming clinical picture and procedural risks (coagulopathy, etc.)

Know how to select patients for whom percutaneous interventions would be appropriate

Understand the range of treatment strategies including conservative, interventional and surgical alternatives sufficient to be able to discuss management with referring physicians and patients and formulate appropriate treatment plans

Integrate a variety of imaging modalities (CT, US and fluoroscopy) to optimize percutaneous drainage of intra-abdominal abscesses

Understand the advantages of CT fluoroscopy in accessing difficult fluid collections and placing drainage catheters

Understand the clinical indications, relative and absolute contraindications and risk factors according to site, general patient factors and significant co-morbidities (e.g. describe the indications and contraindications of diagnostic aspiration of pleural fluid collections and percutaneous chest tube drainage of complicated pleural effusion/empyema)

Assess complications including drain displacement, worsening sepsis, haemorrhagic complications, and multiple organ dysfunction

Demonstrate a fundamental knowledge of chest tube drainage systems including water seal drainage systems and evaluation for persistent air leaks in patients with pneumothorax

Gastrointestinal Interventions

Enteral Tube Placement (Gastrostomy, Jejunostomy, Caecostomy)

Knowledge

Know the relevant anatomy

Understand the pathophysiology of patients requiring enteral tube placement

Clinical Skills

Ensure adequate patient preparation

Identify patients who may benefit from percutaneous gastrostomy, jejunostomy and caecostomy procedures and understand the basic principles of these procedure

Know the indications and contra-indications of these procedures

Be familiar with a wide variety of tubes as well as retention systems

Understand the role of surgical placement of tubes and other methods of feeding or decompression

Technical Skills

Demonstrate technical competence in carrying out the procedures with selection of the most appropriate image guidance

Recognize and treat complications including bleeding

Ensure clear post-procedural instructions and pathways for tube care

Gastrointestinal Stenting

Knowledge

Know the relevant anatomy

Know the pathophysiology relevant to G-I obstruction

Understand the natural history of benign and malignant upper and lower

Gastro-intestinal strictures

Clinical Skills

Know and understand the indications, complications and contraindications for insertion of self-expanding stents for the oesophagus, stomach, duodenum and colon

Know and understand the role of stent insertion for palliation of malignant dysphagia and malignant enteric obstruction and alternative treatment options

Know and understand the 'bridge-to-therapy' concept and the limited role of temporary stenting for benign lesions (e.g. strictures resistant to conventional therapy, and the use of stents for bleeding varices)

Know and understand the different properties of different stent constructions, stent materials, the role and relative merits of biodegradable, covered and uncovered stents and the options offered by removable and anti-reflux stents

Technical Skills

Be able to perform and interpret imaging investigations such as a barium/water soluble enema, enteroclysis, US, CT and CT colonography

Be familiar with the wide variety of stents and delivery systems

Understand the technical aspects of catheter and wire combinations for crossing strictures and occlusions and the types and roles of support wires

Demonstrate technical competence in crossing occlusions and strictures and in the use of support wires and other techniques like “buddy wires” in straightening out tortuous anatomy prior to stent insertion and the implications of this for stent length and type

Demonstrate technical competence in stent insertion and retrieval

Hepato-Pancreatico-Biliary (HPB) Intervention

Knowledge

Know the anatomy of the liver, pancreas and biliary tree, significant anatomical variants and adjacent structures pertinent to understanding disease processes, planning interventional strategies, minimizing, recognizing and managing complications.

Clinical Skills

Understand how disease processes alter anatomy and the implications for interventional strategies (e.g. level of obstruction and endoscopic vs. percutaneous approaches)

Know various methods for obtaining biopsies and/or cytology of biliary strictures

Integrate proper pre-procedure imaging work-up in patients with benign and malignant biliary obstruction

Understand the range of treatment strategies including medical, endoscopic, interventional and surgical alternatives to a level sufficient to discuss management with patients and formulate appropriate treatment plans

Know the anatomical changes following surgical intervention for HPB cancer

Interpret pre-procedural imaging to produce an effective interventional strategy for relief of obstructive jaundice

Technical Skills

Demonstrating an understanding of:

The selection of a drainage route(s) most appropriate to segmental anatomy and disease distribution

The assessment of potential complications related to individual patient anatomy

Demonstrate familiarity with a wide array of percutaneous biliary access systems, and all equipment available for HPB interventional procedures including access and drainage systems, balloons, baskets, stents and stent grafts

Demonstrate skills in percutaneous trans-hepatic cholangiography and biliary drainage under a combination of fluoroscopic and ultrasound guidance

Organize appropriate post procedural management following drainage procedures to assess response to the intervention and recognize and

Manage complications including haemorrhage, infection, and drain displacement

Describe the major complications associated with percutaneous trans-hepatic cholangiography and biliary drainage and management of them

Recognize patients at high risk of sepsis following biliary interventions and understand how to treat post procedural sepsis

Manage patients with arterio-biliary fistulae or bleeding following percutaneous biliary drainage

Non-Vascular Interventional Oncology

Image-Guided Ablation

- Hepatic Disease
- Renal Disease
- Lung Disease
- Skeletal Disease
- Other Disease Locations e.g. Prostate

Knowledge

- An understanding of anatomic criteria for IGA in different locations
- Know the natural history of treated and untreated malignancy
- Understand the pathophysiological process in terms of vascular recruitment and tumour angiogenesis relevant to vascular and non-vascular intervention

Clinical Skills

- Understand the range of treatment strategies including medical, interventional and surgical alternatives and be able to balance and assess the relative merits of the various strategies and thereby select patients who will benefit from IGA

- Recognise the differences between organs in terms of thermal and electrical conductivity which result in differences in ablation times and protocols

Technical Skills

- Plan optimal procedural access, patient positioning and relevant/optional image guidance methods. Be able to utilise multiple guidance methods if necessary
- Demonstrate competence in performing IGA
- Be able to recognise adverse events promptly and be able to advise on appropriate medical, interventional radiological or surgical intervention
- Devise a plan for patient follow-up with imaging, laboratory tests and clinical evaluation in order to assess treatment success and detect disease recurrence or new lesions

Intervention of the Genito-Urinary Tract and Renal Transplants

Knowledge

Know the normal and variant ureteric and bladder anatomy (including post-cystectomy or post bladder augmentation)

Know the anatomy of the various retroperitoneal spaces

Know the radiological and glandular anatomy of the prostate gland

Know the surgical and radiological anatomy of renal transplants

Be familiar with the risk factors and epidemiology of the common GU disorders:

Renal stone disease

Urinary tract cancers

Benign tumours and cysts

Male and female infertility

Renal failure, replacement therapy and transplantation

Understand the causes and the pathophysiology of the common GU disorders; in particular the causes, risk factors and pathology of renal stone disease, causes of pelvi-calyceal and ureteric obstruction and the common urinary tract cancers

Understand the causes of acute and chronic renal obstruction, both benign and malignant

Clinical Skills

Plan the radiological investigation of suspected ureteric obstruction or ureteric leaks

Understand the use and limitations of the various radiological modalities for the diagnosis and planning of renal stone management

Understand the role of CT and MR for the investigation of the common urinary tract cancers and their complications. The role of imaging in the diagnosis and evaluation of the renal mass and its place in the planning of imaging-guided therapy

Understand the role of angiography, Duplex US, CTA and MRA for the evaluation of reno-vascular disorders and transplant dysfunction

Understand contrast agents, renal toxicity and how this may be limited

Understand the role of interventional radiology in the overall management of the common disorders of the genito-urinary tract and renal transplants

Be able to discuss the likely outcome and complications of the proposed intervention procedure and the alternative surgical or medical options

Technical skills

Demonstrate competence in planning and performing interventional procedures applicable to the genito-urinary tract and renal transplants including Percutaneous Nephrostomy Insertion, Ante-grade ureteric Stent Insertion Retrograde ureteric Stent Insertion and manage any complications that may occur

Prostate Cancer, Prostatitis Priapism

Knowledge

Understand zonal and vascular anatomy of the prostate gland and male genitalia

Understand the incidence and etiology of prostate cancer

Clinical Skills

Be able to perform and interpret the imaging modalities used in prostate disease for diagnosis, staging and follow up (TRUS, CT, MRI, and PET)

Acquire the necessary competence to perform and interpret trans-rectal ultrasound (TRUS)

Be familiar with the different probes and needles/biopsy devices used for biopsies

(TRUS-guided)

Understand the triaging of patients presenting with high PSA

Understand the management of prostate cancer and different treatment modalities and be involved in the appropriate MDT meetings

Have a good knowledge of the follow up protocols

Technical Skills

- Acquire the necessary competence to carry out interventional procedures relevant to prostate and male genitalia.
- Understand the complications of the procedure and how to avoid them
- Demonstrate competence in performing prostate ablation therapies

2a Syllabus for Interventional Neuroradiology training

It is expected that the trainee has already acquired the core knowledge in

- neuroanatomy and neurovascular anatomy
- angiographic anatomy of the brain, spine, spinal cord, head and neck
- physiology of brain and spine
- clinical features, basic neurological examination and imaging features of diseases that are to be treated INR techniques
- pharmacology and use of anticoagulation (Heparin Warfarin and newer antiplatelet agents)

During the training period the trainee should learn

- I. Indications for INR techniques
- II. Contraindications for INR techniques
- III. Alternative Neurological and surgical treatment options
- IV. Technical aspects of INR procedures
- V. Pre-procedure and post- procedure management of patients undergoing INR techniques
- VI. Neuro-intensive care management in collaboration with Neuro-intensivist and neurosurgeons
- VII. Management of complications of INR procedures
- VIII. Successful conduction of audit and research work

Key specific skills need to be learned by the trainee include

- I. Selective intra and extracranial vessel cannulation with microcatheters
- II. Provocative testing
- III. Deployment of GDC and mechanical detachable coils
- IV. Embolization with particulate and liquid embolic material
- V. Angioplasty and stenting of supra-aortic and intracranial vessels
- VI. Thrombolysis and clot retraction

Annex 3 - Research Proposal and Research Report

This annex contains the following details

- A. Introduction - Research Proposal and Research Report
- B. Format for writing a research proposal
- C. Format for reviewers to report on research proposals
- D. Guidance to supervisors of research projects
- E. Format for progress reports
- F. Format for Research Report

A. Introduction - Research Proposal and Research Report

All PGIM trainees are expected to undertake a research project, either during pre-MD or post MD training or both. Such a study should not include case reports, but may take the form of a well-designed audit.

The trainee should submit research proposals within two months of commencing post-MD training.

The research proposal must be submitted to the BOSR for approval before commencing the study.

The proposal should be evaluated by a reviewer nominated by the BOSR.

The proposal should have a reasonable timeline for completion. If the proposal is unsatisfactory, the reviewer may recommend modification of the proposal or submission of a different proposal. The trainee should commence the study only after obtaining approval of the BOSR and ethical clearance.

Relevant ethical clearance, and in the case of clinical trials, registration with a Clinical Trials Registry must be obtained prior to commencement of the study.

The trainee is required to nominate a primary supervisor for the project, usually the trainee's current trainer.

The trainee must submit six monthly progress reports through the primary supervisor to the BOSR. The supervisor should provide feedback to the trainee.

Acceptance of the research project by the BOSR may be based on fulfilment of either of the following:

1. Publication of the research findings as an **original full paper** (not case reports) in a **peer-reviewed journal** (preferably indexed) with the trainee as first author. No further evaluation is required on the premise that a paper which is already peer-reviewed.
OR
2. Submission of a detailed project report to the BOSR. This should be evaluated by two assessors nominated by the BOSR.
 - a. If the project is considered unsatisfactory by both assessors, the trainee will be requested to revise and resubmit, with written feedback on the required revisions. If

the project report is still unsatisfactory, the trainee may, at the discretion of the BOSR, be asked to extend the same research project or undertake a new research project which will have to go through the same procedure of approval as the initial project.

- b. If there is disagreement between the two assessors, with only one assessor's decision being 'unsatisfactory', the project report should be sent to a third assessor for a final decision.
 - c. Presentation of the research findings at a recognized scientific congress, either local or international, as oral or poster presentation, should be encouraged.
3. The criteria indicated in 1 and 2 above must be fulfilled prior to the PBCA.

B. Format for writing a research proposal

The aim of the research component is to plan and complete a scientific research project, with due appreciation of the need for scientific validity and ethical principles, within organizational and financial constraints. The choice of the research project will be primarily that of the trainee, but this should be discussed with and approved by the supervisor. The trainee should prepare a research proposal which will be submitted to the BOSR for approval prior to commencement of the study.

Time frame: the research proposal should be approved within the time period stipulated by the BOSR.

Format:

In general, the research proposal should be limited to 3000 words. The following structure is suggested:

- Title of the study
- List of investigators
- Collaborating institutions
- Background/introduction: this should include an overview of the subject related to the research project, with a relevant review of the literature.
- Justification: This section should provide a brief justification of the importance and relevance of the study proposed, including the feasibility of the study.
- Objectives: general and specific objectives of the study should be clearly defined.
- Methods: The methodology to be adopted to achieve the listed objectives should be given in detail; the following sub-sections are suggested as a guide:
 - Study design
 - Study period
 - Study population
 - Sample size calculation
 - Sampling technique
 - Study instruments
 - Data collection
 - Proposed statistically analysis
 - Ethic clearance and consent, and confidentiality of data
 - Proposed methods for dissemination of findings
- Annexes: the following annexes should be provided:
 - Data proforma/s
 - Consent forms, where relevant in all three languages
 - Other relevant supporting documents

The trainees are advised to use Microsoft Word® for formatting documents. The software Endnote®, Reference Manager® or Mendelay® should be used, if possible, for citations. The reference format should follow the Vancouver® Style.

Both soft and hard copies of the documents should be submitted to the BOSR, through the supervisor.

C. Format for reviewers to report on research proposals

The reviewers of the research project should rate the research proposal as satisfactory or unsatisfactory. The main sections should be rated as satisfactory or unsatisfactory, and, if rated as unsatisfactory, specific comments should be provided. General statements should be avoided, and the reviewers should specifically what deficiencies are present and how they could be addressed.

Section	Satisfactory or Unsatisfactory	Remarks
Background		
Justification		
Objectives		
Methods		
Overall		

Recommendation: Accept as is / Revise and resubmit / reject

If a proposal is rejected altogether, the trainee will be expected to submit a new proposal.

D. Guidance to supervisors of research projects

1. The supervisor should guide the student in planning, carrying out research methodology and in presentation of the work, including the writing of the dissertation.
2. The supervisor should obtain recommendation of the research proposal from a reviewer.
3. The supervisor should forward progress report(s) in the prescribed form at the end of 3 months after the trainee commences work on the research project and 3 months after completing the project work.
4. 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.
5. The dissertation should comprise the trainee’s own account of his / her research.
6. It should be satisfactory as regards literary presentation.

7. The dissertation should be certified by the supervisor as suitable for submission.
8. 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. The research methodology should achieve the objectives stated. The results should be presented effectively. The discussion should include comments on the significance of results, how they agree or differ from published work and theoretical / practical applications of the results, if any. The conclusions should be valid and be based on the results obtained on the study.
9. 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 is obtained by a recognized Ethical Committee.
10. 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 BOSR. In such instances, a follow-up report should be forwarded within three months or earlier if necessary to the BOSR.

E. Format for progress reports

The progress reports should have the following components:

- By the trainee: Description of work carried out to date
- By the supervisor:
 - Whether the research project is progressing satisfactorily
 - Constraints
 - Whether the dissertation writing is on schedule
 - Whether overall progress is satisfactory

F. Format for Research Report

The following format should be adopted for research reports

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

1. Title page

<Title of dissertation>

<Author's name>

MD (subject)

Post Graduate Institute of Medicine

University of Colombo

<Year of submission>

2. Statement of originality: This is a declaration that the work presented in the dissertation is the candidate's own, and that no part of the dissertation has been submitted earlier or concurrently for any other degree. The statement should be signed by the author, and countersigned by the supervisor.
3. Abstract: This should consist of a brief summary of not more than 350 words describing the objectives of the work, the materials and methods used, the results obtained, and the conclusions drawn. This may be in a structured format if helpful.
4. 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.
5. List of tables: This lists the tables in the order in which they occur in the text, with the page numbers.
6. 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 Research Report should be divided into clearly defined sections. Sections may be subdivided.

Introduction: The aim of this section is to state briefly the current position and the reasons for carrying out the present work. Generally, only a few references should be cited here.

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 is followed by a detailed review of the specific problem. The review is in many cases approached as a historical record of the development of knowledge of the subject. This chapter should conclude with a brief statement of what you propose to find out.

Materials and Methods: These should be described so that a reader could repeat all the experiments. 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.

Results: Much of the data should be given in tables and figures and these should be inserted in the text at the appropriate place. The results must be fully described in the text. It is not sufficient to merely present the tables and figures without any comment. The tables and figures should be clear without references to the text, and this requires concise explanations in legends. Where possible, data presented in the text should have already been analyzed and the complete 'raw' figures should not be included in this section but should be contained in tables in the Appendix.

Only data from the present work should be included in this section and in particular no comparison should be made at this stage with results from other workers.

Discussion: The discussion is the most difficult part of the dissertation to write because the author has to compare **critically** the present results with those of other workers and to draw valid conclusions from these studies. Descriptions of other workers findings which already appear in the Literature Review should not be repeated in the Discussion. Instead, refer to the Review.

The limitations of the study and recommendations for future research on the subject should also be included in this chapter.

As your project proceeds, keep notes of your thoughts and discussions relevant to this section.

References

All references should be cited in the text. The Vancouver style should be used for references, and should be listed in the order of citation. Endnote[®], Reference Manager[®] or Mendeley[®] referencing software should be used for citations.

Annex 4 Reflective Training Portfolio for Senior Registrars in IR

The contents of the portfolio should encompass all of the above learning outcomes and contain evidence of achievement of these outcomes by the trainee. Although some of these may have been evaluated before the MD examination, the portfolio assessed at the PBCA should mainly contain evidence of achievements during post-MD training, either locally or overseas.

The portfolio should be reviewed at least every six months by the local supervisor(s), with regular feedback to the trainee on how the portfolio may be improved.

Contents of portfolio

1. Subject expertise
2. Teaching
3. Research and audit
4. Ethics and medico-legal issues
5. Information technology
6. Life-long learning
7. Reflective practice

a. Contents of the portfolio

The contents of the portfolio should be divided into sections according to the outcomes stated above, followed by a final section that contains evidence of reflective practice.

The following list sets out the type of evidence that may have to be included in each section.

1. Subject expertise:
 - progress reports from supervisors (essential, should be according to prescribed format)
 - Supervisor feedback on communication skills
 - log of procedures carried out
 - results of any work-place assessments conducted
 - this section must include evidence that the trainee has acquired the essential knowledge, skills and competencies related to the subspecialty of Neuroradiology identified by the BOSR, and monitored with regular assessments throughout the period of post-MD training, e.g. mini-Clinical Examinations, Case-Based Discussions, Direct Observation of Practical Skills

2. Teaching
 - undergraduates
 - postgraduates
 - ancillary health staff
3. Research and Audit relevant to specialty or subspecialty
 - Dissertations / theses
 - Research papers published or accepted for publication
 - abstracts of presentations
 - Clinical audit
4. Ethics and Medico-legal Issues
 - Completed Professionalism Observation Forms (from integrated learning component of Professionalism Strand)
 - Completed PTR forms during post-MD training
5. Information Technology
 - Participation in training programmes / workshops
 - Evidence of searching for information and application of findings in practice
6. Life-long learning
 - Participation in conferences and meetings
7. Reflective practice
 - narration of at least one learning event experienced by the trainee, in relation to each of the above outcomes, with reflection on what and how the trainee learned from this experience

To be board certified as a Specialist in IR in order to practice independently in Sri Lanka, on completion of the in-service training before and after the MD Radiology Examination, the trainee shall

- a) have administrative and organizational skills
- b) be able to clearly document and prioritize problems
- c) have skills appropriate to a specialist (competency in all radiological procedures and interventional procedures expected from an Interventional Radiologist/ Interventional Neuroradiologist, counseling, risk management, management of medico-legal issues)
- d) have administrative and organizational skills
- e) be able to clearly document and prioritize problems
- f) have skills appropriate to a specialist (competency in all radiological procedures and interventional procedures expected from an Interventional Radiologist/ Interventional Neuroradiologist, counseling, risk management, management of medico-legal issues)

b. Instructions to trainees

Given below is a suggested format of the portfolio. Trainees are encouraged to be innovative and creative in documenting.

1. Name of Senior Registrar in IR	:	.....
2. Date of Commencement of Training	:	.....
3. Date of Completion of Training	:	.....
4. Local Training	:	.....
	
	
Supervisor/s		.....
	
5. Overseas training	:	.....
Training Centre/s		.....
	
Supervisor/s		.....
	
6. Were all the progress reports received from the overseas trainers	:	.....
Yes/ No		.....
	
If No, details		.....
	
7. Date of Board Certification as a Specialist in Radiology		.....
	

PART 1

LOG OF: - EXAMINATIONS /PROCEDURES PERFORMED

EDUCATIONAL COURSES/SCIENTIFIC SESSIONS ATTENDED

- TEACHING BY TRAINEE
- ATTACHMENTS/ROTATIONS COMPLETED

Please add extra pages for documentation of examinations and procedures if required

ULTRASOUND SCANNING

Date	DUS	PAED Brain 50	Name of Supervisor	Signature of Supervisor
Total				

Interventional procedures - include details

Date	Biopsy Compulsory50	Specify	Name of Supervisor	Signature of Supervisor
Total				

EDUCATIONAL COURSES/SCIENTIFIC MEETING ATTENDED

**Annual Academic Sessions and Clinico-radiological meetings organized by the Sri Lanka
College of Radiologists can be included**

Title	Date	Venue	Perceived Benefit to Trainee	Contribution to the field from the benefit gained

TEACHING BY TRAINEE

Date	Topic	Audience

ATTACHMENTS/ROTATIONS COMPLETED

YEAR OF TRAINING	DATES	SPECIALTY	HOSPITAL	TRAINER'S SIGN.

PART 2

INTERESTING CASES

No. of cases to be documented - 10

Cases should be documented with available results of Plain Radiographic, Ultrasound, CT, MRI, Nuclear Medicine, Interventional procedure/s, surgical findings, Histopathological, Microbiological, Haematological findings and a literature survey on the Case.

Please add extra pages for documentation of cases

PART 3: Research and Audits

Please use the format given in this prospectus for documentation

PART 4: Log book: Instructions and Format

Log Book Entry of IR/ INR Procedures - Instructions to Trainers and Trainees

The log book should be a part of the reflective portfolio.

1. A log book has to be maintained by the trainees in IR and NIR. This log book will be a record of practical work done by trainee and will provide written evidence of the gradual progress made by them during in-service training programme. Furthermore the discussions at Step 7 will give the trainees a continuous feedback of their performances.
2. All diagnostic and therapeutic interventions and any other procedure considered as relevant are to be entered in the log book.
3. Procedures entered in the log book are to be the procedures done by the trainee under supervision or procedures where the trainee has assisted to the Trainer.
4. Entrees are to be made according to the format provided by the Board of Study in Radiology.
5. Entrees should preferably be type written.
6. It is the responsibility of the trainee to get the log entrees checked and signed by the Consultant Radiologist under whose supervision the procedures were done, within 01 week of carrying out the study.
7. Consultant Radiologist should assess the entrees and grade those according to the grading scheme provided.
8. Discussion of the procedures at this step also will provide useful opportunities for trainees to improve their knowledge and skills and to overcome any deficiencies and limitations observed at that level.
9. Attitudes of the trainees too can be assessed and discussed at this stage.
10. Signed entrees are to be classified technique wise and should be included in the log book in the calendar order in which the procedures were done.

11. Trainees must have the log books regularly updated and should submit those for inspection by trainers and supervisors on request, for appraisal meetings and on other occasions as deemed necessary by the PGIM.

Format for Log Book Entries by Post-MD Trainees

Procedure:

No:

Institution:

Date:

Assisted to the procedure / done under supervision

Details of the patient:

Name			
Age		Sex	
Ward/clinic		BHT/Clinic No.	

Referring consultant

Relevant clinical history:

Indication for the procedure:

Pre-procedure Investigations:

Preparation of patient:

Details of technique:

Complications:

Post-procedure care:

Feedback:

Lessons learnt:

Report:

Consultant Radiologist (Trainer):

Grade by supervisor: 1 2 3 4 5 (Select one – marking guide is given below)

- 5 - Excellent (Nothing found wanting)
- 4 – Very Good (There is some room for improvement)
- 3 - Pass (There is more room for improvement)
- 2 - Borderline (There is a lot of room for improvement)
- 1 - Fail (Needs considerable improvement)

The purpose of this grading is to assess whether the skills of the trainees in conducting the radiological procedures show an improvement with time.

Supervisor's comments:

Supervisor's signature:

PART 5: Post MD Local Training in IR - RECORD BOOK

This has to be a part of the reflective portfolio which has to be submitted by the trainee to the PGIM, with the application for Board Certification.

Name of the Trainee

Date of enrolment to the Radiology training programme

Center of the Pre MD training

Date of passing the MD Radiology Part I examination

Date of passing the MD Radiology Part II examination

Date of commencement of post MD local training

Date of completion of post MD local training

IR on Probation at a training center recognized for post MD training (1 month)

Training center

Names of the supervisors

Date of commencement

Date of completion

Leave taken - No of days-

Casual / vacation / other

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's comments

- 5- Excellent
- 4 - Very Good
- 3 - Pass
- 2 - Borderline
- 1 - Fail

Supervisor's signature

Doppler Ultrasonography (1 month at a main training centre)

Specialty

Center

Date of commencement

Date of completion

Leave

Leave taken - No of days-

Casual / vacation / other

Supervisor's comments

- **5** - Excellent
- **4** - Very Good
- **3** - Pass
- **2** - Borderline
- **1** - Fail

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's name and signature

CTA, MRA (1 month at a main training centre)

Specialty -

Center-

Date of commencement-

Date of completion-

Leave taken - No of days-

Casual / vacation / other

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's comments

- **5** - Excellent
- **4** - Very Good
- **3** - Pass
- **2** - Borderline
- **1** - Fail

Supervisor’s name and signature

Trauma imaging (1 month at a main training centre)

Specialty

Center

Date of commencement

Date of completion-

Leave taken - No of days-

Casual / vacation / other

Supervisor’s Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor’s comments

- **5** - Excellent
- **4** - Very Good
- **3** - Pass
- **2** - Borderline
- **1** - Fail

Supervisor’s name and signature

Oncology imaging (1 month at CIM)

Specialty

Center

Date of commencement

Date of completion

Leave taken - No of days-

Casual / vacation / other

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's comments

- **5** - Excellent
- **4** - Very Good
- **3** - Pass
- **2** - Borderline
- **1** - Fail

Supervisor's name and signature

Ultrasonography (1 month)

Specialty

Center

Date of commencement

Date of completion

Leave taken - No of days-

Casual / vacation / other

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's comments

- **5** - Excellent
- **4** - Very Good
- **3** - Pass
- **2** - Borderline
- **1** - Fail

Supervisor's name and signature

IR (18 months)

Specialty

Center

Date of commencement

Date of completion

Leavetaken - No - of days

Casual / vacation / other

Supervisor's Name	Comments on the Trainee					
	Attitudes	Punctuality	Practical skills	Knowledge	Communicating skills	Presentation/attendance at Journal clubs Clinical meeting

Supervisor's comments

- **5** - Excellent
- **4** - Very Good
- **3** - Pass
- **2** - Borderline
- **1** - Fail

Supervisor's name and signature

NB: Given above is a suggested format of the portfolio. Trainees are encouraged to be innovative and creative in documenting. They must use computing and ICT skills to generate paper based entries to be included in the portfolio.

Annex 5 Duties and Responsibilities of the Trainers

The roles and responsibilities of a trainer are multiple:

- A. Clinical Supervisor
- B. Supervisor of a research project
- C. Reviewer/assessor of a research project
- D. Supervisor of the Training Portfolio
- E. Role model
- F. Examiner

A. As a trainer, he/she should

1. Be involved in teaching and ensure trainees learn on the job.
2. Allocate time for trainees to discuss academic as well as personal issues.
3. In instances of unsatisfactory behavior, attitude or problems of the trainee if the trainer is not the Designated Supervisor first warn the trainee and if the situation persists, inform the Designated Supervisor of the trainee to sort out the problem at grass root level. As a last resort, inform the Director of Post Graduate Institute of Medicine and Board of Study in Radiology so that remedial action can be taken. Communications on such issues should be copied to the trainee's Designated Supervisor.
4. Consult the Specialty Board in IR and Board of Study in Radiology and inform the Designated Supervisor of the trainee, if a trainee is required to repeat any duration of a clinical appointment or any other appointment.
5. Send progress reports to the Board of Study in Radiology, every six months.
6. Supervise the leave arrangements of trainees. (Warn the trainees if in excess and remind them that leave is not a right but a privilege, but give their due)
7. Encourage trainees to participate in continuing medical and professional development activities such as time to visit the library, participate in other clinical meetings, workshops, critical appraisal of journal articles etc.
8. Encourage presentations by the trainees in clinical meetings, CPD activities etc.
9. Conduct workplace based assessments –as indicated in the portfolio guidelines.
10. Inform the Specialty Board in IR and Board of Study in Radiology if more than 2 weeks of leave is to be taken by trainer.
11. Arrange for cover up of leave for training purposes (since this may be different from work cover up)
12. Inform the Specialty Board in IR and Board of Study in Radiology and give adequate time for the Board to decide on an appropriate course of action if more than 1 month leave is to be taken,
13. Handover the required letters of release/ attest to the satisfactory completion of log book/ record book / portfolio of the trainees on completion of an appointment by the trainee.

Annex 6 Criteria for Accreditation of Training Centres and Special Units

1. Status of the hospital to which the proposed radiology department is attached.
2. Availability of radiology equipment in the proposed radiology department
3. Work load of the proposed Radiology department
4. Trainers in the proposed Radiology department
5. Teaching programme and facilities

1. Status of the hospital to which the proposed radiology department is attached.

- i. State sector teaching hospital with an affiliation to a university approved by the UGC
- ii. The hospital should have teaching units identified by the PGIM for post graduate training in Medicine, Surgery, Gynaecology and Obstetrics and Paediatrics
- iii. Minimum bed strength of 1000
- iv. Minimum patient turnover of about 500 per day

2. Availability of radiology equipment in the proposed radiology department

Availability of following imaging equipment is mandatory

- i. Dedicated angiography machine for IR. Biplane angiography machine for INR.
- ii. Analogue/DR/ CR static plain XRay Unit
- iii. Ultrasound machines capable of performing soft tissue and Doppler studies
- iv. Spiral CT machine
- v. MRI Scanner
- vi. Fluoroscopy
- vii. Gamma Camera

3. Work load of the proposed Radiology department

The proposed Radiology department should have minimum work load in respective imaging modalities as stated below

- i. Plain XRay
- ii. Ultrasound including Doppler studies
- iii. Special investigations including Fluoroscopy studies
- iv. Non vascular interventions
- v. Vascular interventions

4. Trainers in the proposed radiology department

- i. Minimum of 2 Interventional Radiologists with at least 4 years of post- Board certification experience in a state sector hospital
- ii. Conduct clinic radiological meetings , journal club sessions in the department
- iii. Engage in updating radiology knowledge such as CME programmes, locally/ internationally
- iv. Radiologist should have been involved in conducting the post graduate lectures in MD Part 1 or Part 11 in two preceding years
- v. Should maintain a film library in the department
- vi. Should maintain a roster for smooth functioning of the department across the various imaging modalities, including a on call roster supervised by trainers

5. Teaching programme and facilities

- i. Spacious main reporting room with adequate facilities- To be evaluated during site visit
- ii. Facilities for instant (automat)reporting
- iii. Proposed teaching activity programme of the department
- iv. Film library/ Digital film archive

Annex 7 IR-DOPS Guidance for Assessors

The IR / INR Directly Observation of Procedural Skills (DOPS) focuses on the skills that trainees require when undertaking a clinical practical procedure. The DOPS is a focused observation or “snapshot” of a trainee undertaking a practical procedure. Not all elements need be assessed on each occasion. You may explore a trainee’s related knowledge where you feel appropriate.

Instructions:

1. Please ensure that the patient is aware that the Rad-DOPS is being carried out.
2. You should directly observe the trainee performing the procedure to be assessed in a normal environment and explore knowledge where appropriate.
3. Please assess the trainee on the scale shown. Please note that your rating should reflect the performance of the trainee against that which you would reasonably expect at their stage of training and level of experience.
4. Please give an overall rating of the trainee’s performance using the options in question 13.
5. Please give feedback to the trainee after the assessment. This should include specific written comments on areas of good practise and constructive feedback on areas for further development.
6. Encourage the trainee to provide written comment on their performance and any actions required.

Descriptors of competencies demonstrated during Rad-DOPS: Demonstrates understanding of indications, relevant anatomy and technique	Does the trainee know the relevant indications, anatomical landmarks, and techniques relevant to the procedure?
Explains procedure/risks to patient, obtains informed consent where appropriate	Is there a clear explanation of the proposed procedure to the patient, with the patient given an opportunity to ask questions? Where informed consent is sought, is this documented appropriately?
Uses appropriate analgesia or safe sedation	Does the trainee use adequate amounts of appropriate drugs to minimize patient discomfort? Is this titrated where appropriate?
Usage of Equipment	Does the trainee show an understanding on the radiology equipment with appropriate tool/ probe selection and utilization? Does he/she optimize equipment parameters for individual examinations?
Infection prevention and control	The trainee demonstrates good aseptic technique where appropriate with demonstration of principles of infection prevention and control.
Technical ability	Most pertinent to practical applications such as ultrasound and screening. Is there satisfactory hand/eye co-ordination?
Seeks help if appropriate	Does the trainee recognize his/her limitations and request assistance when appropriate?

Minimizes use of ionizing radiation for procedures involving x-rays	Where the procedure involves ionizing radiation.
Quality of Diagnostic images obtained	The trainee tailors the number and quality of images to the procedure and patient.
Communication skills with patient/staff	Is the trainee polite, and exhibits a sense of self within a team structure? Is he/she able to convey understanding to others?
Quality of report of procedure	Does the report have a clear, concise, clinically appropriate and lucid appearance, within the context of other available clinico-radiological information?
Judgement/insight	For example, the trainee stops the procedure if unforeseen complications are encountered.

IR Direct Observation of Procedural Skills (DOPS)

Date of Assessment		
Name of Trainee		
Name of Assessor		

Year of training :

Clinical Setting : Interventional Radiology Neuro Interventional Radiology

Procedure :

Number of times this procedure previously performed by trainee :

0 1-4 5-10 >10

Difficulty of procedure : Low Medium High

Well below expectation for stage of training *Below expectation for stage of training* *Borderline for stage of training* *Meets expectation for stage of training* *Above expectation for stage of training* *Well above expectation for stage of training* *Unable to comment **

1. Demonstrates understanding of indications, relevant anatomy and technique
2. Explains procedure/risks to patient, obtains/confirms informed consent where appropriate
3. Uses appropriate analgesia or safe sedation/drugs
4. Usage of equipment
5. Infection prevention and control

Unsatisfactory Satisfactory Not applicable

6. Technical ability
7. Seeks help if appropriate
8. Minimizes use of ionizing radiation for procedures
9. Communication with patients/staff
10. Quality of diagnostic images
11. Judgement/Insight
12. Quality of report of procedure

13. OVERALL COMPETENCE

Rating	Description
<input type="checkbox"/> Trainee requires additional support and supervision	Demonstrates basic radiological procedural skills resulting in incomplete examination findings. Shows limited clinical judgement following encounter
<input type="checkbox"/> Trainee requires direct supervision (performed at level expected during Core training)	Demonstrates sound radiological procedural skills resulting in adequate examination findings. Shows basic clinical judgement following encounter
<input type="checkbox"/> Trainee requires minimum/indirect supervision (performed at the level expected on completion of Core Training)	Demonstrates good radiological procedural skills resulting in sound examination findings. Shows good clinical judgement following encounter
<input type="checkbox"/> Trainee requires very little/no senior input and able to practice independently (performed at level expected during Higher Training)	Demonstrates excellent and timely radiological procedural skills resulting in a comprehensive examination. Shows good clinical judgement following encounter

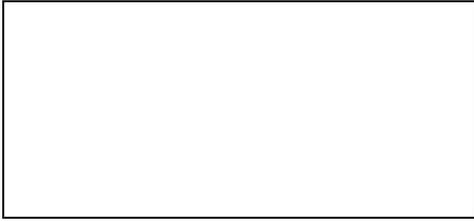
***Unable to comment** – Please mark this if you have **not observed** the behaviour and feel unable to comment.

Further mandatory questions on the following page

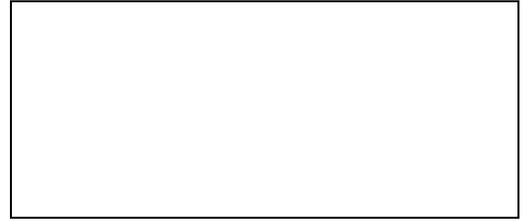
Assessor's comments – state areas of good practice and areas for development
(mandatory field)

Trainee's comments – comment on your performance and any actions required
(mandatory field)

Trainee's Signature

An empty rectangular box with a black border, intended for the trainee's signature.

Assessor's Signature

An empty rectangular box with a black border, intended for the assessor's signature.

Annex 9 - Progress Reports – local training

NAME OF TRAINEE:

PERIOD OF TRAINING:

HOSPITAL AND Training Centre:

NAME OF THE SUPERVISOR:

Practical Skills	Grade
Clinical evaluation	
Radiological procedure ; pre and post procedure care	
Procedural skill	
Radiological Diagnosis	
Detection and management of complications	
Imaging follow up	

Academic Skills	Grade
Theoretical knowledge	
Knowledge of current literature	
Participation in academic activities	

Communication Skills	Grade
Report writing	
Demonstrate appropriate communication skills with patients , relatives and others	

General Conduct	Grade
Responsibility and conscientiousness	
Punctuality	

Comments on particular weaknesses and suggested remedies:

Grade:

5 - Excellent (Nothing found wanting)

4 – Very Good (There is some room for improvement)

3 - Pass (There is more room for improvement)

2 - Borderline (There is a lot of room for improvement)

1 - Fail (Needs considerable improvement)

Date:

Signature of Trainer

Annex 10 - Format for progress report on radiology trainees – overseas and elective appointments

NAME OF TRAINEE:

PERIOD OF TRAINING:

HOSPITAL AND UNIT:

NAME OF THE CONSULTANT:

SPECIALTY:

COUNTRY:

Marking guide

5 - Excellent (Nothing found wanting)

4 – Very Good (There is some room for improvement)

3 - Pass (There is more room for improvement)

2 - Borderline (There is a lot of room for improvement)

1 - Fail (Needs considerable improvement)

	Excellent	Very good	pass	Borderline	Fail
Theoretical knowledge					
Clinical decision making					
Clinical skills					
Operative skills					
Ability to cope with emergencies & complications					
Thinks 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					

Overall grade (select one): Excellent / Very Good / Pass / Borderline / Fail

General / Specific comments and action taken to improve (especially when the Grade awarded is borderline or fail):

Signature of the trainer:

Date:

Annex 11 Recommended Books/Journals for reading

Text Books

1. Vascular and Interventional Radiology: The Requisites, (Requisites in Radiology) 2nd Edition by John A. Kaufman (Author), Michael J. Lee (Author)
2. Abrams' Angiography Interventional Radiology 3rd Edition
3. Interventional Neuroradiology (Techniques in Interventional Radiology) 2014th Edition by Kieran Murphy (Editor), Fergus Robertson (Editor)
4. Case-Based Interventional Neuroradiology --- Print ISBN:9781604063738
5. Handbook of Interventional Radiologic Procedures (Lippincott Williams & Wilkins Handbook Series) Fourth Edition by **Krishna Kandarpa (Author), Lindsay Machan (Editor)**
6. Interventional Radiology: A Survival Guide, 3rd Edition by David Kessel (Author), Iain Robertson (Author)

Journals

1. Journal of vascular and Interventional Radiology <http://www.jvir.org/>
2. Cardio-Vascular and Interventional Radiology ISSN: 0174-1551 (Print) 1432-086X (Online)
3. Interventional Neuroradiology <http://intl-ine.sagepub.com>