

NUCLEAR MEDICINE

The objective of this handbook is to outline the minimum expected training, knowledge, skill and competency for nuclear medicine physicians in this country, to use radioactive medical products (radiopharmaceuticals), to study and to treat diseases.

Specialists in nuclear medicine shall take a keen interest and be responsible for the quality and safety of all procedures performed by nuclear medicine personnel at the facility and the potential impacts to public and environment. Only certified specialists in nuclear medicine shall hold the necessary licenses and regulatory obligation from appropriate authority, to prescribe and administer radioactive substances to human.

National Specialist Advisory Committee for Nuclear Medicine

National Specialist Advisory Committee for Nuclear Medicine has been established under the auspices of National Credentialing Committee, to undertake the task of defining training criteria and standard of practice of Nuclear Medicine specialty in Malaysia.

Members:

- Dr. Felix Sundram
- Dato' Dr. Mohamed Ali Abdul Khader
- Dr. Lee Boon Nang
- Dr. Sulaiman Tamanang
- Prof. Madya Dr. Sazilah Ahmad Sarji
- Dr. Noreen Norfaraheen Lee Abdullah
- Dr. Ng Chen Siew

Functions of the committee:

1. To review and develop a standardized, comprehensive training module for nuclear medicine specialty in Malaysia.
2. To monitor the training programme and accredit training centers both locally and abroad.
3. To review and assess the progress of trainees in nuclear medicine and to recommend credentialing of a trainee who has satisfactorily completed training programme for registration with National Specialist Register.
4. To review the accreditation status of institutions and re-credentialing of nuclear medicine physicians.
5. To assess relevant CPD/CME activities in relation to nuclear medicine specialty, conducted both locally and abroad.
6. To monitor both local and overseas trends in nuclear medicine in order to ensure the standard of nuclear medicine practice keeps pace with current and projected requirement.

Minimum Criteria for Registering as a Nuclear Medicine Physician in the Malaysian National Specialist Register

The Scope Of Nuclear Medicine

Nuclear Medicine (NM) utilizes the nuclear properties of matter to investigate disorders of metabolism and function, of physiology and pathophysiology, and of anatomy to diagnose disease with unsealed sources and to treat it with unsealed sources of radioactivity. The range of activities that are implicit within this definition include in vitro procedures, in vivo imaging with radiopharmaceuticals and other techniques related to nuclear physics in medicine as well as the medical applications of radiobiology, dosimetry and radiation protection. (ref: European Board of Nuclear Medicine)

Entry Criteria

Basic Medical Degree

1. Possess a basic medical degree recognized by the Malaysian Medical Council (MMC)
2. Is fully registered as a medical doctor with the MMC

Post-Graduate Specialist Qualifications

There are two routes to registration as Nuclear Medicine Physician under National Specialist Register:

3. Route A:

This category applies to those applicants who have taken up this specialty in addition to their current basic specialty. They must possess the following recognized qualification and clinical experience:

- Must be a qualified Radiologist, Internal Medicine Physician or other clinical specialist, registered with the respective specialty under National Specialist Register, Malaysia.
- Following registration in National Specialist Register Malaysia, should then have been trained for a period of not less than 3 years, under an accredited supervisor, at a recognized Nuclear Medicine training centre.
- Should have fulfilled all the required criteria stated inside the Nuclear Medicine specialty training content (Appendix A), satisfactory completed the clinical experience logbook (Appendix B), and submitted all the necessary recorded or required documents to National Specialist Advisory Committee for Nuclear Medicine, for evaluation and approval.

4. Route B:

This category applies to those applicants who possess a recognized qualification of Master of Medicine (Nuclear Medicine) (USM).

5. For any equivalent qualification from other universities, the applicant must provide:
 - All the necessary records or documents on Nuclear Medicine specialty training and clinical experience logbook must be submitted to National Specialist Advisory Committee for Nuclear Medicine under National Credentialing Committee, Malaysia for evaluation and approval.
 - A narrative report from an accredited supervisor
6. Any application that does not conform to any of the above requirements shall be reviewed on a case to case basis by National Specialist Advisory Committee for Nuclear Medicine.

Training Duration

7. **Route A:** The duration of training shall be a minimum of 3 years, with full time exposure and involvement in both diagnostic and therapeutic nuclear medicine in recognized Nuclear Medicine centers. Any delay in completion of training or request for extension of training will be considered individually by National Specialist Advisory Committee for Nuclear Medicine.
8. **Route B:** There should be a minimum of 4 years training in Master of Medicine (Nuclear Medicine) (USM).

Training Content

9. Details on the training content (route A) are attached in Appendix A. These training modules and contents are taken from the sources listed below. However, the committee shall review these modules and make necessary changes to suit local content as deemed necessary.
 - i. Section of Nuclear Medicine, European Board of Nuclear Medicine
 - ii. Nuclear Medicine specialty training, Hong Kong College of Radiologists, Hong Kong Academy of Medicine
 - iii. Advanced training in Nuclear Medicine, Academy of Medicine, Singapore
 - iv. Nuclear medicine resources manual. — International Atomic Energy Agency, Vienna, 2006.
 - v. Curriculum for Higher Specialist Training in Nuclear Medicine, February 2000 by Joint Committee on Higher Medical Training, UK.

Training Centers and Trainers

10. Training in the nuclear medical specialty can only be undertaken in approved posts in accredited nuclear medicine training centres (Appendix D).
11. Other institutions for nuclear medicine training will be considered on an individual basis by this committee.
12. The training will be conducted in accredited centers locally in MOH, Universities or the private sector.

13. Accredited centers shall be reviewed and recommended periodically.
14. An accredited supervisor (Nuclear Medicine) in Malaysia is one who has registered as Nuclear Medicine Physician under National Specialist Register and has been practicing Nuclear Medicine for at least 2 years after registration, in one of the accredited Nuclear Medicine training centres in Malaysia.

Logbook

15. Nuclear Medicine trainees under route A are required to maintain a logbook (Appendix B), that should detail their clinical experience during training and shall record the following:
 - Type of procedures done
 - Type of patients treated
 - Number of cases observed/assisted/performed under supervision and cases performed independently
 - CME activities
 - Papers written
16. The supervisor will certify the logbook every six months and a written commentary on the progress of the trainee should be included. A minimum number of cases (to be determined by the sub-committee) performed should be achieved by the trainee before he/she can be considered for registration as nuclear medicine physician.

Training Assessment

17. The supervisor will be required to submit to this committee a special report on the trainee after the first 6 months of training, the initial report should address specifically the suitability of the candidate to continue with this specialty training.
18. A structured format for assessment and reporting (Appendix C) shall be prepared for this purpose. Assessment should be carried out six monthly by the accredited supervisor and should be submitted to this committee.
19. Trainees will be required to maintain a clinical experience logbook to documents procedures/ clinical activities done.

Certification

20. Trainee under route A will be exit certified upon satisfactory completion of the programme. The criteria for awarding certification of recognition for registration should be based on overall performance, competence evidenced in their logbook as well as the progress report from his respective supervisors.

Renewal of Registration

21. Renewal of registration as Nuclear Medicine Physician under National Specialist Register, Malaysia will be required at five yearly intervals. Continual practicing and participation in CPD/CME activities are required to obtain recertification.

Registration under Grandparent Clause

22. Existing senior specialists, other than the Nuclear Medicine specialty, who have been practicing and continue to practice in Nuclear Medicine specialty, and wish to register in this discipline, may apply to register under the section on “Grandparent Clause”, that will operate till the end of 2010. (see section on Grandparent Clause for further details)

Special Notes

23. Advanced subspecialty training in nuclear medicine (e.g. nuclear cardiology, nuclear oncology, paediatric nuclear medicine etc.) shall be considered at a later stage.
24. The above stated criteria and requirement for application for registration as nuclear medicine physician under Malaysian National Specialist Register, will be reviewed by National Specialist Advisory Committee for Nuclear Medicine from time to time.
25. If an applicant has made a false claim on an application, National Specialist Advisory Committee for Nuclear Medicine may recommend to the National Credentialing Committee, Malaysia on removal of his or her name from the Register until the deficiency is rectified.

Grandparent Clause

1. National Specialist Advisory Committee for Nuclear Medicine, acknowledges that in Malaysia, except for the MOH gazettement guidelines for Nuclear Medicine Physician, there is otherwise no known officially recognized training module for specialists in this field. To register current practicing Nuclear Medicine specialists, a grandparent clause is therefore necessary.
2. The current practicing Nuclear Medicine specialists may apply to register under the transitional (grandparenting) arrangement, provided they meet the requirements of "Grandparent Clause" that will expire in March 2014.
3. Candidates for registration as Nuclear Medicine Physicians under Grandparent Clause must fulfill the following requirements:
 - 3.1 Must be a qualified specialist.
 - 3.2 Must have relevant nuclear medicine sciences and clinical training, covering diagnostic and therapeutic aspects of nuclear medicine specialty.
 - 3.3 Must have at least 3 years' whole time equivalent of nuclear medicine clinical work experience (refer paragraph 4).
 - 3.4 Must have recent work experience and currently practicing in the field of nuclear medicine, at an established nuclear medicine centre, for a period of not less than 6 months prior to the application.
4. National Specialist Advisory Committee for Nuclear Medicine has defined whole time clinical work experience required for registration under grandparenting arrangement as, 20 hours or more per week, in a year with not less than 300 nuclear medicine cases handled over this period of time.
5. All applicants to register under this clause will have to provide documentation that they have acceptable qualification, relevant training and working experience in nuclear medicine.
6. Anyone wishing to register under transitional (grandparenting) arrangement, who has qualification but does not meet the requirement on recent work experience (section 3.4), will have to provide more detailed information showing how they can undertake relevant work experience and be assessed and declared competent by the National Specialist Advisory Committee for Nuclear Medicine.
7. Nuclear Medicine Physician registered under grandparent clause will be considered as an eligible trainer/supervisor, if he/she is currently working in one of the accredited hospitals, recognized for Nuclear Medicine training.

Explanatory notes for PET Nuclear Medicine:

8. Any services involving the use of radiopharmaceuticals, including SPECT/CT or PET/CT procedures shall be supervised, performed and reported by a registered nuclear medicine specialist. Those procedures involving the use of intravenous contrast agents should preferably be reported together with a clinical radiologist.

9. Positron emission tomography (PET) and its related services, is a component of the specialty of nuclear medicine. Only those specialists, who have been recognized as nuclear medicine specialists are eligible for credentialing for PET.
10. National Specialist Advisory Committee for Nuclear Medicine under National Credentialing Committee, Malaysia, acknowledge the importance of ensuring all specialists registered under nuclear medicine specialty must be fully trained, competent and eligible providers for PET and its related services. Under this transitional (grandparenting) arrangement, additional credentialing will be required.
11. Training in PET and its related services has been incorporated into the core training in nuclear medicine stipulates under the Nuclear Medicine Specialty Training (route A) and Master of Medicine (Nuclear Medicine) (route B).

Reviewed by National Specialist Advisory Committee for Nuclear Medicine

Dated: 30th June 2009

Appendix A

Nuclear Medicine Specialty
Training Content
(by route A)

Introduction:

Specialists in nuclear medicine shall be qualified by experience and training to assess the proper role of nuclear medicine procedures in patient management, and to direct the performance and to evaluate the quality of such procedures. They are expected to have a sound knowledge in nuclear medicine science, be competent in using radioactive medical products (radiopharmaceuticals) for diagnosis and therapeutic purposes, capable to promote utilization of available nuclear medicine services at different settings and to counsel against unnecessary nuclear medicine procedures.

Training programme should provide both the *educational experience* and *clinical experience* to the trainee. Training process will take a duration of not less than 3 years, with full time exposure and involvement in both diagnostic and therapeutic nuclear medicine services.

Educational Experience in Nuclear Medicine

The scientific basis of the specialty requires all trainees to receive instruction on relevant basic science, instrumentation, mathematics modelling, tracer radiation protection, radiopharmacy and radiochemistry. There is a need to cover these topics in sufficient depth to be of permanent value to a future Nuclear Medicine Physician though not at such depth as to be of interest only to the physicists, radiopharmacists or instrumentation specialists.

There are also complex legal and regulatory requirements concerning nuclear medicine. These include the production and administration of radiopharmaceuticals, radiation protection relating to patient, the general public and hospital staff and requirements for research and patient consent. Trainees will need appropriate knowledge in all of these aspects of nuclear medicine. The objectives of this educational experience are:

- (a) To allow a trainee to acquire and be familiar with general basic knowledge in Nuclear Medicine.
- (b) To be able to assimilate and review basic science considerations, develop a disciplined habit of reasoning and a logical approach to specific medical problems with respect to Nuclear Medicine.
- (c) To appreciate the importance of Nuclear Medicine in the whole system of patient care and health.
- (d) To be conversant with the current practice in diagnostic and therapeutic aspects of Nuclear Medicine.
- (e) To be able to communicate with nuclear physicists, radiopharmacists, nuclear medicine technologists and other category of staff members or clinical colleagues and render appropriate recommendation on patient management.

Clinical Experience in Nuclear Medicine

The clinical experience covers participation in the performance of a sufficient number and wide variety of studies listed inside the approved log-book covering imaging and non-imaging diagnostic investigations and therapeutic section in Nuclear Medicine. At the end of the training, they should show competency in:

- (a) Evaluating the patient's problem.
- (b) Giving justification of carrying out the Nuclear Medicine procedures.
- (c) Selecting an optimum Nuclear Medicine study or treatment for the patient.
- (d) Performing the required studies or treatments with radiopharmaceuticals.
- (e) Interpreting and giving advice on the information obtained.
- (f) Correlating the information with other diagnostic studies or treatment received.
- (g) Following up patients receiving radionuclide diagnosis or treatment.
- (h) Promoting utilization of available nuclear medicine services at different settings, and to counsel against unnecessary nuclear medicine procedures.
- (i) Overseeing the overall radiation safety and protection involved for the department/ institution/ hospital/ public.

Training for Nuclear Medicine Physician:

1. Theoretical grounding in Nuclear Medicine

Trainees will require appropriate instruction in clinical, scientific and legal aspects of the specialty. A minimum of 30 hours of formal description of general principles of NM procedures is required. Active participation in clinical presentations, seminar and meetings is recommended.

Nuclear physicians have to be familiar with and have knowledge of:

- Physics (as applied to NM)
- Biostatistics
- Pharmacology, immunology
- Radiochemistry
- Radiopharmacy
- Biokinetics
- Radiobiology and risk assessment
- Radioprotection
- Computer Science
- Instrumentation and methodology
- Quality control
- Relevant legislation

Subject matter to be covered:

Physical Science: structure of matter, modes of radioactive decay and particle and photon emissions, and interactions of radiation with matter.

Instrumentation: nuclear medicine instrumentation with special emphasis on the gamma scintillation cameras, PET machines, radiation detector collimation, associated electronic instruments and computers, and image production and display. Knowledge of complementary and correlative roles of other diagnostic tools, specifically ultrasonography, CT and MRI.

Mathematics, Statistics, and Computer Sciences: these include probability distributions, medical decision making, basic aspects of computer structure and function, programming and processing.

Radiation Biology and Protection: biological effects of ionizing radiation, means of reducing radiation exposure, calculation of the radiation dose, evaluation of radiation overexposure, establishment of radiation safety programmes, storage and shielding, preparation, dispensing, administration of doses, minimising radiation dose to staff, annual dose limits, monitoring of working areas and persons, decontamination procedures in dealing with spills, waste disposal, protection of patient, their contacts and their comforters and carers

Statutory and Advisory Publications in Radiation Protection: Atomic Energy Licensing Act 1984 (Law of Malaysia, Act 304) and its other related regulations, codes of practice, recommendation and publications from International Commission on Radiation Protection (ICRP), local rules and other guidance, product licensing, responsibility for radiation safety, transport of radioactive materials, medico-legal responsibility, routine inspection and testing of equipment, notification of faults and hazard warnings.

Radiopharmaceuticals: production of radionuclides, radiochemistry, pharmacokinetics and formation of radiopharmaceuticals.

Diagnostic Uses of Radionuclides: clinical indications, technical performance and interpretation of in vivo imaging and function studies using radionuclides; use of scintillation cameras, PET & PET/CT machines and external detectors; physiologic gating techniques; patient monitoring during intervention studies; and an understanding of the relationship between nuclear medicine procedures and other pertinent imaging modalities such as computed tomography, ultrasonography, and magnetic resonance imaging.

In Vitro Studies: principles of competitive binding and radioimmunoassay procedures; principles of activation analysis and autoradiography.

Principles of Therapeutic Uses of Radionuclides: patient selection, dose administration, including dosimetry and specific applications, isolation and radiation safety.

Anatomy and Physiology: the trainee is required to be familiar with the basic anatomy and physiology relevant to common nuclear medicine imaging examinations. There should be a clear understanding of topographic and cross-sectional anatomy as displayed by SPECT/PET imaging. Knowledge of normal variation in anatomy will also be expected.

Clinical Nuclear Medicine Studies: used of various radiopharmaceuticals, clinical application, specific indications, integration of physics, instrumentation, dosimetry, anatomy, biochemistry and pathophysiology relevant to or specific to each individual study, principle and methodology of data acquisition, analysis and interpretation of each individual procedure and correlation with other imaging and diagnostic modalities as deemed relevant to the practice of nuclear medicine. The following systems should be covered:

- (a) musculoskeletal system
- (b) respiratory system
- (c) gastrointestinal tract and hepatobiliary system
- (d) genitourinary tract

- (e) cardiovascular system
- (f) haematological and lymphatic system
- (g) central nervous system
- (h) endocrine system

2. In vivo diagnostic procedures

A total number of 3000 procedures must be supervised and reported by the trainee and the quality of these audited. These should include a wide range of pathology and include paediatric studies. The recommended number for each procedure is as follows:-

	No. of studies
(a) central nervous system	30
(b) skeletal system	1000
(c) cardiovascular system (at least 80% perfusion with stress)	500
(d) pulmonary system	50
(e) gastro-intestinal system	150
(f) urogenital system	400
(g) endocrine system	400
(h) haemopoietic and lymphatic system(s)	50
(i) tumours and inflammation	100

In order to ensure that the trainee has sufficient experience in various subsets of in vivo nuclear medicine diagnostic technique, following recommended number of technical exposure is expected:-

	No. of studies
(a) Static planar studies	1000
(b) Dynamic studies	200
(c) Gated studies	200
(d) Tomographic studies (of which 50% are PET related)	600
(e) Gamma probe (optional)	20

Some flexibility may be accepted but a broad spectrum of most currently used procedures has to be covered. This list will be subjected to periodic revision. It is recommended that a period of training is spent away from the main department in at least one other accredited training centre.

3. In vitro procedures (optional)

Training can also cover analysis with (radio)-immunological methods, quality control and interpretation. In this case a minimum of 3 months' training should be given.

4. Therapy

Training in therapeutic applications must include clinical evaluation, supervision and follow up of patients having therapeutic doses of radionuclides, including aspects of dosimetry and radiation protection. Trainees will be expected to participate in thyroid clinics (both new patient and follow-up) and may need to attend joint clinics with other disciplines, e.g. oncologists, to gain experience in the less common procedures.

	No. of treatments
Thyroid patients	
Benign diseases	60
Malignant disease	20
Other radionuclide treatments	10

These training module and contents took reference from the following sources. However, the committee shall review these modules and make necessary changes to suit local content as deemed necessary.

References:

- i. Section of Nuclear Medicine, European Board of Nuclear Medicine
- ii. Nuclear Medicine specialty training, Hong Kong College of Radiologists, Hong Kong Academy of Medicine
- iii. Advanced training in Nuclear Medicine, Academy of Medicine, Singapore
- iv. Nuclear medicine resources manual. — International Atomic Energy Agency, Vienna, 2006.
- v. Curriculum for Higher Specialist Training in Nuclear Medicine, February 2000 by Joint Committee on Higher Medical Training, UK, courtesy from Prof K E Britton, Professor in Nuclear Medicine and Head of Department of Nuclear Medicine, St. Bartholomew Hospital, London.

Appendix B

**Logbook
for
Nuclear Medicine Specialty Training
(by route A)**

EVALUATION FORM

- 1. Name:
- 2. I.C. No:
- 3. Post-Graduate Qualification:
- 4. Date of Post-Graduate Qualification:
- 5. Date of Basic Specialist Registration under
National Specialist Register, Malaysia:
- 6. Basic Specialist Registration No.:
- 7. Date of Commencement for Nuclear Medicine Specialty Training:
- 8. Date of Expected Completion:
- 9. Days of Leave Taken:

SUPERVISOR'S PARTICULARS

- 1. Name:
- 2. Designation:
- 3. Registration No. for Nuclear Medicine under
National Specialist Register, Malaysia:
- 4. Other co-supervisors:

<p><i>For Office Use Only</i></p> <p>Duration of Extension (if any):</p> <p>Date of Actual Completion :</p>
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Sections:

- A. Theoretical Grounding in Nuclear Medicine
- B. Clinical Experience Record in Nuclear Medicine
 - B.1. In-vivo Diagnostic Procedures
 - B.1. a) Based on body system
 - B.1. b) Based on nuclear medicine technique
 - B.2. In-vitro Diagnostic Procedures (Optional)
 - B.3. Radionuclide Therapy
- C. List of Courses, Seminars & Conferences Attended
- D. Teaching Experience
- E. Supervisor's Overall Assessment on Candidate
 - E.1. Personality Assessment
 - E.2. Knowledge and Academic Ability
 - E.3. Clinical Ability
 - E.4. Narrative Report

Trainee: _____

A. Theoretical Grounding in Nuclear Medicine

Item	Topic	Supervisor's endorsement
1.	<i>Physical Science</i> : structure of matter, modes of radioactive decay and particle and photon emissions, and interactions of radiation with matter.	
2.	<i>Instrumentation</i> : nuclear medicine instrumentation with special emphasis on the gamma scintillation cameras, PET machines, radiation detector collimation, associated electronic instruments and computers, and image production and display. Knowledge of complementary and correlative roles of other diagnostic tools, specifically ultrasonography, CT and MRI.	
3.	<i>Mathematics, Statistics, and Computer Sciences</i> : these include probability distributions, medical decision making, basic aspects of computer structure and function, programming and processing.	
4.	<i>Radiation Biology and Protection</i> : biological effects of ionizing radiation, means of reducing radiation exposure, calculation of the radiation dose, evaluation of radiation overexposure, establishment of radiation safety programmes, storage and shielding, preparation, dispensing, administration of doses, minimising radiation dose to staff, annual dose limits, monitoring of working areas and persons, decontamination procedures in dealing with spills, waste disposal, protection of patient, their contacts and their comforters and carers	
5.	<i>Statutory and Advisory Publications in Radiation Protection</i> : Atomic Energy Licensing Act 1984 (Law of Malaysia, Act 304) and its other related regulations, codes of practice, recommendation and publications from International Commission on Radiation Protection (ICRP), local rules and other guidance, product licensing, responsibility for radiation safety, transport of radioactive materials, medico-legal responsibility, routine inspection and testing of equipment, notification of faults and hazard warnings.	
6.	<i>Radiopharmaceuticals</i> : production of radionuclides, radiochemistry, pharmacokinetics and formation of radiopharmaceuticals.	
7.	<i>Diagnostic Uses of Radionuclides</i> : clinical indications, technical performance and interpretation of in vivo imaging and function studies using radionuclides; use of scintillation cameras, PET & PET/CT machines and external detectors; physiologic gating techniques; patient monitoring during intervention studies; and an understanding of the relationship between nuclear medicine procedures and other pertinent imaging modalities such as computed tomography, ultrasonography, and magnetic resonance imaging.	
8.	<i>In Vitro Studies</i> : principles of competitive binding and radioimmunoassay procedures; principles of activation analysis and autoradiography.	
9.	<i>Principles of Therapeutic Uses of Radionuclides</i> : patient selection, dose administration, including dosimetry and specific applications, isolation and radiation safety.	
10.	<i>Anatomy and Physiology</i> : the trainee is required to be familiar with the basic anatomy and physiology relevant to common nuclear medicine imaging examinations. There should be a clear understanding of topographic and cross-sectional anatomy as displayed by SPECT/PET imaging. Knowledge of normal variation in anatomy will also be expected.	

Trainee: _____

11.	<p><i>Clinical Nuclear Medicine Studies:</i> used of various radiopharmaceuticals, clinical application, specific indications, integration of physics, instrumentation, dosimetry, anatomy, biochemistry and pathophysiology relevant to or specific to each individual study, principle and methodology of data acquisition, analysis and interpretation of each individual procedure and correlation with other imaging and diagnostic modalities as deemed relevant to the practice of nuclear medicine. The following systems are covered:</p> <ul style="list-style-type: none">(i) musculoskeletal system(j) respiratory system(k) gastrointestinal tract and hepatobiliary system(l) genitourinary tract(m) cardiovascular system(n) haematological and lymphatic system(o) central nervous system(p) endocrine system	
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Comments from supervisor:

Trainee: _____

B. Clinical Experience Record in Nuclear Medicine

Following are summary of clinical experience. However, complete lists and details of individual cases / procedures done should be entered into a logbook from the beginning of the training, assessed by supervisor from time to time and must be submitted separately for verification purposes. The layout of this logbook is provided as in Appendix 2.

B.1. In-vivo Diagnostic Procedures

B.1. a) Based on body system

System	Number of Studies/Cases	
	Discussed/Observed/Conducted under supervision	Done independently
Central Nervous System		
Skeletal System		
Cardiovascular System		
Pulmonary System		
Gastro-intestinal System		
Urogenital System		
Endocrine System		
Haemopoietic System		
Tumor & Inflammation		

B.1. b) Based on nuclear medicine technique

Technique	Number of Studies/Cases	
	Discussed/Observed/Conducted under supervision	Done independently
Static Planar Studies		
Dynamic Studies		
Gated Studies		
Tomographic Studies SPECT or SPECT/CT PET or PET/CT		
Gamma Probe (optional)		

Trainee: _____

B.2. In-vitro Diagnostic Procedures (Optional)

Procedure	Number of Studies/Cases	
	Discussed/Observed/Conducted under supervision	Done independently

B.3. Radionuclide Therapy

Procedure	Number of Cases	
	Discussed/Observed/Conducted under supervision	Done independently
Thyroid patients Benign diseases Malignant disease		
Other radionuclide treatments:		

Endorsed by,

.....
Supervisor

Example of log book record:

LOG OF CASES / PROCEDURES PERFORMED

Cardiovascular System

Radionuclide: _____ **Chemical form:** _____ **Investigation:** _____

No.	Date	Procedures	Patient's Name	I/C	Diagnosis	*O/ A/ P	**Assessment by Supervisor
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

* Please choose either observed (O), assisted (A) and performed (P) for the procedures done

**Assessment is made on knowledge, clinical & technical skill, attitude, problem solving and decision making etc.

Trainee: _____

C. List of Courses, Seminars & Conferences Attended

DATE	DETAILS	PLACE

D. Teaching Experience

Undergraduates, interns, residents, nurses, allied health professionals, consumer groups and organizations.

DATE	DETAILS	PLACE

**Assessment Report
for
Nuclear Medicine Specialty Training
(by route A)**

Trainee: _____

Date: _____

E. Supervisor's Overall Assessment on Candidate

E.1. PERSONALITY ASSESSMENT

A. Personal Characteristics

Characteristics	Poor		Fair		Good		Excellent	
	1	2	3	4	5	6	7	8
Professional Attributes								
Punctuality								
Responsibility								
Availability								
Appearance/ Attire/ Hygiene								
Managerial Skill/ Leadership Ability								
Relationship with Patient / Family								
Relationship with Fellow Professionals & Colleagues								
Relationship with Non-Clinical Staff								

Remarks:

1. Dynamic and Proactive
2. Moderate Enthusiasm
3. Passive
4. Disinterested and Indifferent
5. Others

Please Specify: _____

Trainee: _____

Date: _____

E.2. KNOWLEDGE AND ACADEMIC ABILITY

Criteria	Poor		Fair		Good		Excellent	
	1	2	3	4	5	6	7	8
Knowledge								
Journal Reading								
Teaching Ability								
Documentation & Record Keeping								
Case Presentation								
Conference/ Service Attendance/ Participation								
Research Activity								
QA Activity								
Case Write Up								
Involvement in Professional Bodies								
Involvement & Interest In CME Activities								

E.3. CLINICAL ABILITY

Patient Management	Poor		Fair		Good		Excellent	
	1	2	3	4	5	6	7	8
Interview Skill								
Physical Examination								
Clinical Judgement & Diagnostic Ability								
Decision Making								
Rationale of Investigation								
Discussion / Case Presentation								
Promptness & Effectiveness in Assessing & Treating Emergency Patients								
Competence & Appropriateness In Providing Continuing Care								

Remarks:

Trainee: _____

Date: _____

E.4. FORMAT OF NARRATIVE REPORT
(Supervisors Report)

The narrative report should include the following assessment criteria:

1. Personal Characteristics
2. Knowledge and Academic Ability
3. Clinical Competence:
 - i. Inquiry skills
 - ii. Problem solving & decision making
 - iii. Patient management
 - iv. Technical skills
 - v. Knowledge
4. Personal Learning & Assignments
5. Social & Communication Skills
6. Documentation & Record Keeping
7. Participation in Teaching & Learning Activities
8. Recommendations on suitability for gazettement

Certified by :

Name;

Designation:

Date:

Official Stamp:

Appendix D

Training Centres

The following departments and institutions for training are acceptable:

Institutions	Gen.NM	PET/CT
<u>Ministry of Health:</u>		
Department of Nuclear Medicine, Hospital P. Pinang	√	√
Department of Nuclear Medicine, Hospital Kuala Lumpur	√	
Department of Nuclear Medicine, PET & Cyclotron, Hospital Putrajaya		√
Department of Nuclear Medicine, Hospital Sultanah Aminah, Johor Bahru	√	
<u>Ministry of Higher Education</u>		
Nuclear Medicine Department, USM	√	
Nuclear Medicine Division UMMC	√	
Nuclear Medicine Unit, HUKM	√	
<u>Private Institutions</u>		
Nuclear Medicine Division, Subang Jaya Medical Centre	√	√
Wijaya International Medical Centre, PET & Cyclotron Division		√
Unit of Nuclear Cardiology, National Heart Institute	√	
Nuclear Medicine Centre, National Cancer Society of Malaysia	√	

For overseas centres, candidate training will be reviewed on a case to case basis. The training can be recognized in part or in total if it is found to be equivalent to the local training programme.