

DIVISION OF GRADUATE MEDICAL STUDIES (DGMS)

&

JOINT COMMITTEE ON SPECIALIST TRAINING

BASIC TRAINING AND EXAMINATION REQUIREMENTS

FOR THE DEGREE OF

MASTER OF MEDICINE IN ANAESTHESIOLOGY



Nov 06

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I. **INTRODUCTION**

A candidate for the degree of Master of Medicine (Anaesthesiology) is required to pass a Primary and a Final examination.

He has to complete an approved basic training programme before he can sit for the Final examination.

The MMED (Anaesthesiology) is the entry qualification into Advanced Specialty Training in Anaesthesiology.

II. **OBJECTIVES**

At the end of the basic training programme, a candidate should be able to -

1. assess the pre-operative status of a patient;
2. optimise the patient's condition before surgery;
3. safely conduct anaesthesia throughout the intra-operative period;
4. manage post-operative care including acute pain management;
5. manage critically ill patients;
6. manage pain relief in labour and delivery and;
7. administer cardio-pulmonary resuscitation.

III. **BASIC TRAINING PROGRAMME FOR MMED**

1. DURATION

Duration of training shall be three years full-time anaesthetic appointment in recognised hospitals after full medical registration. Anaesthetic posting done prior to Basic Traineeship appointment are accepted for admission to the examinations, provided such posting are supervised and logged.

2. CONTENT OF TRAINING

- (1) In the first twelve months of the training, the candidate should administer anaesthesia for general surgical, orthopaedic, urology and gynaecological cases. Candidates are encouraged to complete an accredited ATLS course prior to the Final examination.
- (2) In the remaining twenty-four months, the candidate should have adequate exposure to intensive care and to anaesthesia for the following disciplines –

(a) **CARDIOVASCULAR SURGERY**

Assist in closed and open-heart surgery, abdominal and thoracic aortic aneurysms. Familiar with problems associated with hypothermia during open-heart surgery.

(b) **DENTAL SURGERY AND MAXILLOFACIAL SURGERY**

Handle problems of anaesthesia for day surgery in Dental Clinic and hospital. Anaesthetic management including difficult intubation and post-operative management of upper airway in patient coming for oral surgery like impacted wisdom teeth, fracture and wiring of mandible, plastic surgery around the jaw and maxilla, and patients with severe oral infection threatening the airway, eg quinsy and Ludwig's angina.

(c) **ELECTROCONVULSIVE THERAPY (ECT)**

Anaesthetic management and care of airway during and after the ECT. Possible impact of neuropsychiatric medication.

(d) **ENT**

Anaesthesia for tonsillectomy/tympanoplasty involving oral, nasal tubes and preformed tubes. Direct laryngoscopy using insufflation technique. Ventilating with injectoflex or Carden's tube, total laryngectomy with complete monitoring, maxillectomy, oesophagoscopy using rigid oesophagoscope for removal of foreign body. Bronchoscopy; diagnostic and therapeutic. PNS, post-operative management of glossectomy and hemi or total mandibulectomy, laser surgery in upper airway.

(e) **OPHTHALMOLOGY**

EUA in paediatric cases, cataract, squint surgery, detached retina, glaucoma, perforating injury of the eye. Physiology and pathological problems involving increased intraocular pressure. Interaction of anaesthetic drugs and drugs used in ophthalmology. Awareness of oculo-cardiac reflex.

(f) **GENERAL SURGERY ESPECIALLY IN EMERGENCY CASES**

Assessment of patients, ordering pre-medication and managing patients in the intra-operative and post-operative period.

(g) **OBSTETRICS & GYNAECOLOGY**

Problems of Anaesthesia for laparoscopy, LSCS including full stomach, effects of narcotics and muscle relaxants on the baby, post-partum haemorrhage, ectopic pregnancy, vaginal

hysterectomy, Wertheim's, termination of pregnancy, obstetrics analgesia and resuscitation of newborn.

(h) **ORTHOPAEDIC AND HAND SURGERY**

Does anaesthesia for all types of orthopaedic surgery including spinal operations with patient lying in the prone position. Learn to perform regional blocks both for therapeutic and anaesthetic purposes eg. epidural injection of steroid for pain relief, intravenous regional analgesia, sciatic and femoral nerve blocks, neurovascular blocks in the upper limb, epidural and spinal blocks for orthopaedic surgery, therapeutic blocks for angiospastic conditions eg. Buerger's. Management of geriatric patients coming for orthopaedic problems.

(i) **OUTPATIENT SURGERY**

Organisation of outpatient anaesthetic service, assessment of patients preoperatively. Choice of drugs, anaesthetic technique for patients who need to be fit for discharge at the end of the day. Discharge criteria.

(j) **PAEDIATRIC SURGERY**

Neonatal and paediatric physiology and pharmacology. Management of fluid balance, temperature control, management of paediatric airway. Routine paediatric cases, eg. circumcisions, herniotomies to major abdominal surgery, eg. portoenterostomy, endorectal pullthrough. Postoperative pain relief for the paediatric patient.

(k) **PAIN MANAGEMENT**

Management of acute postoperative pain; principles of organization of pain clinic, management of chronic pain by pharmacological, physical and other means.

(l) **NEUROSURGERY**

Management of the head injured patient. Monitoring and reduction of increased intracranial pressure. Diagnosis of brain death, meningism, monitoring of air embolism and intracranial pressure.

(m) **PLASTIC SURGERY**

Cleft lip and palate and problems in patients with burn injury. Paediatric airway problems especially in Pierre Robin Syndrome and micrognathia.

(n) **RADIOLOGICAL PROCEDURES**

Management of airway problems in bronchogram. Choice of anaesthetic drugs and techniques in cardio-vascular and neurological investigative and therapeutic procedures performed in diagnostic radiology. Problems of anaesthetising patients in a radiotherapy unit where doctors are not permitted to stay in the radiotherapy room because of the danger of X-ray exposures.

(o) **UROLOGY**

Anaesthesia for TURP, repeated anaesthesia for cystoscopy. Surgery for stones in bladder, ureter or kidneys. Anaesthesia for patient with renal failure involving pharmacological and electrolyte problems.

(p) **THORACIC SURGERY**

Lobectomy, pneumonectomy, pleurodesis. Management of crushed chest injury. Thoracic tumours, Extrapulmonary lesions. Thymectomy including post-operative management. Assessment of lung functions. Fibre-optic bronchoscopy. Use of double lumen tubes and one-lung ventilation.

(q) **INTENSIVE CARE**

Fluid and electrolyte therapy, rational use of antibiotics, I/G and parenteral nutrition, problems associated with artificial ventilation and extubation. Use of Swan Ganz Catheter, management and diagnostic problems associated with the renal, cardiovascular, hepatic, gastro-enterological, respiratory system and endocrine system.

3. **ROTATIONS TO HOSPITALS ACCEPTED FOR TRAINING**

Alexandra Hospital (AH), Changi General Hospital (CGH), Kandang Kerbau Women's and Children's Hospital (KKH), National University Hospital (NUH), Singapore General Hospital (SGH) and Tan Tock Seng Hospital (TTSH) are accepted for training.

Trainees must be exposed to and trained in the various procedures and systems stated in the Basic Anaesthesiology Logbook (refer para 6).

Trainees are encouraged to have a 6-month cross-cluster posting during the 3 years of BST. Hospitals outside Singapore that have an adequate training programme may be accepted for the basic training.

For foreign applicants, please write in to the Examination Board for verification of postings.

4. EDUCATIONAL ACTIVITIES TO BE INCLUDED IN THE TRAINING

Candidates should during this 3-years training period attend all departmental educational meetings and teaching programmes. Candidates are encouraged to attend the Modular/examination preparation courses of DGMS. The topics are listed in Annex A.

5. LEAVE

A candidate should not take more than fourteen (14) days leave, including sick leave during each six-month period. The period spent on full-time courses will not be counted towards postings.

6. LOGBOOK

On entering the basic training programme, the trainees must maintain a logbook until completion of training. During training, the trainee must record a number of procedures specified in the logbook. Reason(s) must be given if the numbers are not achieved at the end of training. The anaesthetic procedures cover the following:

- (i) General surgery
- (ii) Orthopaedics
- (iii) Urology
- (iv) Gynaecology
- (v) Obstetrics Anaesthesia
- (vi) Paediatrics
- (vii) Intensive Care

The logbook must be reviewed every 3 months by supervisors and the Director of the Training or the Head of department. ***Supervisors are required to inform the trainees of their performance, and recommend steps to address any deficiencies.***

IV. **EXAMINATION**

To sit for the Final examination, a candidate must submit together with his application form, the logbook and other material pertinent to the candidate to the DGMS for inspection.

1. EXAMINATION SCHEDULE

The Primary examination is usually held in September and the Final examination in March.

2. VENUE

All sections of examinations will be held in the National University of Singapore.

3. ELIGIBILITY

(1) A candidate for the degree of Master of Medicine in Anaesthesiology is required to pass a Primary and Final Examination.

(2) A candidate must hold a current medical registration to be admitted to the Primary Examination.

(3) In order to be admitted to the Final Examination, a candidate must –
(a) have passed or been exempted from the Primary Examination;
and (b) have held a medical qualification for at least four years and hold current medical registration;
and (c) have completed three years full-time anaesthetic appointments in hospitals accredited by DGMS; and have satisfactorily completed the training programme.

(4) National Service (MO) – national service postings will not be counted towards training in anaesthesia.

4. EXEMPTION(S)

Candidates who have passed the Primary FRCAnaes or Part 1 FANZCA or equivalent may apply for exemption from the Primary M.Med(Anaesthesiology) Examination.

5. SYLLABUS

(1) PRIMARY EXAMINATION

The subjects for the examination are –

- (a) Physiology
- (b) Pharmacology and
- (c) Physics, the principles of clinical measurement and the principles of clinical chemistry with special stress upon those general principles which concern anaesthetists.

Physiology will include a knowledge of body functions in the normal state, the relation of structure to function and the disturbances of function which may arise in anaesthetic practice.

Topics to cover include respiration; circulation; kidney; acid base regulation; body fluids and electrolytes; nervous system; blood; digestion; liver; nutrition and metabolism; endocrine; cellular physiology; maternal, foetal and neonatal physiology.

Pharmacology will include (i) principles of general pharmacology (ii) detailed knowledge of the pharmacology of drugs used in anaesthetic practice – particular attention should be paid to the principles involved in their uptake, distribution and clearance from the body and (iii) detailed knowledge of the therapeutic substances which may be expected to complicate anaesthesia.

Topics to cover include –

- (i) General pharmacology – modes of action and antagonism, absorption of drugs; distribution of drug; uptake and distribution of anaesthetics; metabolism of drug; excretion of drug; antigen-antibody reaction; side effects; toxic effect; tolerance; interaction between drugs, drug evaluation and clinical trials.
- (ii) Detailed pharmacology - of drugs used in anaesthetic practice- sedative and hypnotic drugs; tranquiliser drugs – major and minor; analgesic drugs and their antagonists; general anaesthetic drug; muscle relaxant drugs and their antagonist; local anaesthetic drugs; anti-histamine; antiemetics hypotensive and pressor drugs.
- (iii) Therapeutic agents which may be used in patients presenting for anaesthesia or during post-operative treatment. Anti-thyroid agents, ACTH and corticosteroid agents; cardiac drugs; diuretic drugs; anticoagulant drugs; hypoglycemic drugs; antimicrobial drugs; psychotherapeutic drugs; anti-hypertensive drugs; anti-convulsant drugs; drugs acting on the uterus; cytotoxic drugs; agents used in hormonal replacement therapy.
- (iv) Physiological pharmacology
 - Autonomic nervous system: transmitter substance (pre- and post ganglionic), control of the heart, blood vessels, alimentary canal, bronchi, adrenal, exocrine glands
 - Neuromuscular transmission – polarised membranes, effects of common indications – Na, K, Ca, Mg, Adrenalin.
- (v) Principles of Medical Statistics.

Physics

The principles of clinical measurement and the principles of clinical chemistry:

- (a) Such physics as is necessary to an understanding of respiration and circulation, uptake and distribution of anaesthetics, movements of water and solutes across membranes.
- (b) The physical principles involved in the storage and utilisation of compressed gases in the vaporisation of volatile substances and in the use of high pressure oxygen.
- (c) The nature of explosions and the factors involved in their occurrence.

Clinical Measurement

The principles -

- (a) of the measurement of respiratory function and of gas analysis (including gases in solution),
- (b) of the measurement of cardio-vascular function,
- (c) of the measurement of temperature.

(2) **Final Examination**

The main subjects for the examination are:

- (a) The theory and practice of anaesthesia
- (b) The application of the basic sciences including anatomy to the specialty of anaesthetics
- (c) Medicine, surgery and related pathology.

Anaesthesia

Candidates should be familiar with all aspects of the theory and practice of anaesthesia, the principles of pre-operative and post-operative care and are required to study the application of the basic sciences to the specialty of anaesthetics.

Medicine

A broad general knowledge of the principles and practice of medicine and therapeutics is essential. Particular emphasis will be placed on those aspects including pathology of medical diseases which are related to anaesthesia, surgery and intensive care.

Surgery

Candidates are expected to be familiar with surgical principles and practice which affect the conduct of anaesthetic practice, including pre- and post-anaesthetic care.

7. FORMAT OF EXAMINATION

Primary Examination

The examination will have:

- a) 2 written papers in physiology and pharmacology which will include physics, statistics and clinical measurements.
- b) an oral in physiology and pharmacology.

Both sections must be passed at one and the same examination.

Final Examination

There shall be 3 sections:

- (a) Written Examination - There will be one MCQ and two short answer question papers.
- (b) Oral Examination - There will be an oral examination.
- (c) Structured Clinical Examination – an oral examination on clinical history and investigations.

All sections must be passed at one and the same examination.

8. REQUIREMENTS TO PASS THE EXAMINATION

A candidate must pass all sections of the examination in the same sitting in order to pass the examination. This is applicable to both the primary and final examination.

9. ENTRY FEE

The examination fee (from 2007) is -

Primary M.Med.(Anaes) - \$1700.00 (includes registration fee of \$52.50)

Final M.Med.(Anaes) - \$.230000 (includes registration fee of \$52.50)

A late fee of S\$50.00 is charged for applications received not more than one week after the closing date. Applications will not be accepted seven days after the closing date. All fees are subject to change without prior notice.

10. WITHDRAWAL FROM EXAMINATION

- (1) At the discretion of the DGMS, a candidate withdrawing from the examination may receive a full refund of the examination fee, excluding the registration fee of S\$52.50, provided that such withdrawal is received in writing prior to the date on which entries close.
- (2) A candidate withdrawing an application on or after the closing date, or who fails to appear for an examination for which application has been accepted, may be refunded part of the fee paid on production of medical or other evidence of compassionate grounds within seven (7) days of withdrawal or failure to appear.

11. APPLICATION

- (1) Applications to sit for the examination must be made on a form obtainable from the Manager, Division of Graduate Medical Studies, Faculty of Medicine, Blk MD5, Level 3, 12 Medical Drive, Singapore 117598.
- (2) The application form must be completed and returned to DGMS before the closing date together with the entry fee, log book and other material pertinent to the applicant.

12. VERIFICATION

All candidates must realise that the above arrangements are under continual review and that it is their responsibility to check the current position with the Division of Graduate Medical Studies.

V. **ADVANCED SPECIALTY TRAINING (AST)**

To be eligible to apply for an AST post in Anaesthesiology, Trainees must have:

- a) completed three years of basic training or equivalent experience; and
- b) obtained an MMed (Anaesthesiology) or equivalent qualification.

The 3 years of basic training is determined from the starting date of Basic Traineeship appointment; maximum 12 months accreditation is accorded for relevant postings done before Traineeship appointment. Non-Basic Trainees who have satisfied the above main criteria may also apply for and be selected for AST.

Please contact DGMS for further information on AST.

Division of Graduate Medical Studies
Faculty of Medicine
Blk MD5, Level 3
12 Medical Drive
Singapore 117598

Tel: 68743302 or 68743301
Email: gsmsec@nus.edu.sg

Amended Jan 04

ANNEX A

EDUCATIONAL ACTIVITIES

A. **LECTURES / TUTORIALS**

During the first 2 years, Trainees should acquire knowledge in the following areas:

First Year

1. Premedication Rounds-Preop Assessment
2. Checking Anaesthetic Machines

3. Routine Investigations for patients
4. Monitoring in Anaesthesia
5. Perioperative Fluid Therapy
6. Recovery from Anaesthesia
7. Anaesthesia and Hypertension
8. Anaesthesia and Coronary Artery Disease
9. Anaesthesia and Respiratory Disease
10. Anaesthesia and Renal Disease
11. Anaesthesia and Liver Disease
12. Anaesthesia and Diabetes Melitus
13. Anaesthesia and Thyroid Disease
14. Anaesthesia and Obesity
15. Anaesthesia and the Pregnant Surgical Patient
16. Anaesthesia and Neuromuscular Disease
17. Anaesthesia for the Elderly Patient
18. Anaesthesia for Trauma
19. Anaesthesia for Burns
20. Anaesthesia for Patients on Anticoagulants
21. Surgical Infections
22. Spinal/Epidural Anaesthesia
23. Brachial Plexus Block
24. Anaesthesia for Day Surgery
25. Complications of Anaesthesia

Second Year

1. Anaesthesia for ENT Surgery
2. Anaesthesia for Ophthalmic Surgery
3. Anaesthesia for Neurosurgery
4. Anaesthesia for Vascular Surgery
5. Anaesthesia for Thoracic Surgery
6. Anaesthesia for ECT
7. Anaesthesia for Laparoscopic Procedures
8. Anaesthesia for Plastic Surgery
9. Acute Pain Management
10. Burns
11. Autologous Blood Transfusion
12. Massive Blood Transfusion
13. Total Intravenous Anaesthesia
14. Monitored Anaesthesia Care
15. Hypotensive Anaesthesia
16. Anaphylaxis/anaphylactoid reactions
17. Malignant Hyperpyrexia
18. Difficult Intubation
19. Renal Failure
20. Inotropic support
21. Oxygen therapy
22. Ventilator therapy
23. Septic Shock
24. Multiorgan Failure

B. MODULAR COURSES

In addition, Trainees are encouraged to attend the Primary and Final Anaesthesiology Modular Courses organised by the DGMS, as preparation for the examinations. Attendance in any teaching programmes should be recorded in this logbook. The topics, which are subject to change yearly, are as follows:

(i) Primary Modular Course Topics

1. Introduction
2. Narcotics
3. Intravenous Anaesthetic
4. Agents
5. Cellular Physiology
6. Neurophysiology
7. CVS Physiology
8. Local Anaesthetics
9. Cardiac drugs
10. Respiratory Physiology Part I
11. Respiratory Physiology Part II
12. Renal Physiology
13. Acid-base balance
14. Neuromuscular blockers & Anticholinesterases
15. Biostatics
16. Clinical Measurements
17. Respiratory Physiology Part III
18. Inhalational Agents
19. Pharmacokinetics
20. Trial Viva

(ii) Final Modular Course Topics

1. Cardiac Anaesthesia
2. Pre-operative Assessment & Risk
3. Medical disorders and Anaesthesia
4. Paediatrics Anaesthesia
5. Neuro Anaesthesia/Eye
6. Airway & Crisis Management
7. Thoracic & Vascular Anaesthesia
8. Equipment
9. Regional Anaesthesia/Anatomy
10. Obstetrics Anaesthesia
11. Plastic/ENT/Dental
12. Ventilatory Support/Cardiac Support
13. Acute/Chronic Pain
14. Remote Place/Day Surgery

15. Anaesthesia for ECT/Care of Organ Donor

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