



**CURRICULUM MODULES  
FOR  
TRAINEES  
IN  
ANAESTHESIOLOGY  
  
2013**

DISCIPLINE OF ANAESTHESIOLOGY & CRITICAL CARE MEDICINE

NELSON R MANDELA SCHOOL OF MEDICINE

## Preface

There has long been a need for a detailed document expanding on the curriculum that anaesthesiology registrars need to follow in their training. This document serves as such in this, its initial form.

We have borrowed liberally from ANZCA with their permission, for which we are extremely grateful. Further, the efforts of the consultants in the department need to be recognised. Consultants in that particular field have reviewed each of the modules. Prof Rout has willingly co-ordinated this effort and has been instrumental in putting this document together, and to him we owe a deep gratitude.

The document will need to evolve as groups of registrars work through it and discover parts that need modification or clarification. Further, as our dynamic discipline grows, we will need to make additions. Registrars are thus encouraged to make constructive feedback comments by way of emails to Camy Singh. ([singhc@ukzn.ac.za](mailto:singhc@ukzn.ac.za))

The modules have specifically included elements that have previously not been emphasized enough. Hence the modules on scientific enquiry and professionalism are extremely important as we try to create well-balanced clinical professionals.

This document needs to be used in conjunction with the Learning Portfolio available from the College of Anaesthetists of The Colleges of Medicine of South Africa (CMSA). Further, trainees are referred to the Practice Guidelines document of The South African Society of Anaesthesiologists (SASA) and the Health Professionals Council of South Africa (HPCSA) website.

I trust that this document will be extremely useful to both trainees and supervisors.



P. Dean Gopalan  
Head: Discipline of Anaesthesiology & Critical Care Medicine

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## Introduction

The objective of the UKZN MMed training program is to produce anaesthesiologists who, from day 1 in clinical service, will provide safe and quality care to their patients based upon the attributes that will ultimately qualify them as a specialist anaesthesiologist, namely:

- Medical expert
- Communicator
- Collaborator
- Manager
- Health advocate
- Scholar and teacher
- Professional

Following training, graduates will be qualified as independent practitioners in all areas of anaesthetic practice save those identified as requiring further (post-Fellowship) training, such as Intensive Care Medicine. The program involves acquiring skills appropriate to the Trainee's experience.

A modular approach to training is used to provide an organised framework for learning. The first three modules provide the fundamentals of the practice of anaesthesia, by acquiring skills and experience in clinical anaesthesia, professional attitudes to practice, and a sound knowledge of applied basic science. These three modules do not link directly to any specific clinical rotational allocation but remain relevant throughout. The principles involved must be adapted to all other modules. Although the basic science element of module 1 is formally assessed in the Primary examination, it should be reviewed and expanded appropriately in subsequent clinical modules. It remains on the syllabus for the Final examination, when basic science questions may be asked. Module 2 provides a framework for educational skills development both as a learner and a teacher. It also includes the compulsory Formal Scientific Enquiry that must be completed satisfactorily before the MMed degree is awarded and specialist registration can proceed. Trainees must be aware that the research process contains several steps and there is potential for delay and conflict with personal exam revision timetables. It is recommended that the groundwork for the research component be completed within the first year of training. Module 3 (Professionalism in Practice) is in three sections; the first of which (Personal Attributes) should be applied and developed from day 1 within the department. The remaining sections will be introduced during the latter half of training.

The remaining modules relate to clinical allocations within the department. Allocations are made according to departmental staffing requirements in addition to individual training needs, and are unlikely to be in the sequence suggested by the order of the modules.

All modules have a similarity of approach, based upon the trainee's **Learning Objectives**:

- Knowledge
- Application of professional knowledge and skills to clinical management
- Skills (clinical and technical)
- Attitudes and behaviours

Although all four objectives are relevant to all modules, to avoid repetition only aspects specifically important to the module are highlighted. Thus there is some variation in the format of each module.

The Learning Portfolio is an integral tool for self-assessment (as well as for recording clinical experience and developing study plans). The Trainee is expected to self-evaluate his/her education skills and learning experience from the Learning Portfolio. For example, the Learning Portfolio should show the Trainee's progress through the Module, as records of self-improvement courses undertaken, literature searches and topics reviewed.

### **Educational**

Trainees are expected to learn educational skills that will enable them to develop the following:

- A review of their personal learning plan as specified in their Learning Portfolio
- Identification of the factors that lead to deviation from the original learning plan
- A learning plan in the Portfolio that links basic science teaching to clinical practice

## Module 1 – Introduction to Anaesthesia and Pain Management

### Trainee's Aims

New Trainees should familiarise themselves with the goals of the UKZN MMed program, the attributes they must attain, and the Modules to be completed during Basic Training. The Modules outline the curriculum content and skills for Trainees to learn and accomplish.

In this Module, clinical experience is gained in anaesthesia for uncomplicated elective surgery, day (ambulatory) surgery, and procedural sedation. This commonly includes anaesthesia for elective (non-major) general, orthopaedic, gynaecological, urological, plastic, and endoscopic procedures, including procedures performed outside the operating theatre suite.

The **overall aim of Module 1** is for Trainees to develop a foundation of core knowledge and skills for further development as a specialist in anaesthesia. This includes:

- Conducting safe general anaesthesia and perioperative care for patients where risk is considered low
- Understanding physiology, pharmacology, clinical measurement, and monitoring as applied to anaesthesia, in preparation for the primary examination
- Understanding the principles of acute pain management
- Conducting safe procedural sedation
- Establishing a professional team approach with patients, families, colleagues and staff
- Appraising evidence-based approaches to clinical problems
- Establishing a personal Learning Portfolio and self-education skills

### Knowledge

#### **Basic Sciences**

Trainees are required to understand the subjects in the Basic Sciences to the abilities set out in the MMed *Syllabus for the Basic Sciences in Anaesthesia and Intensive Care* and in The College of Anaesthetists Primary syllabus. Trainees are expected to apply Basic Science and other principles in clinical practice.

#### **Clinical Measurement and Monitoring**

Trainees are required to understand the principles involved in the measurement of relevant variables and the requirements of equipment and monitoring in anaesthesia. Knowledge is expected in the areas outlined below.

#### **Physics and Clinical Measurement**

Principles of Measurement as set out in the syllabus.

- SI units
- Humidification
- Behaviour of fluids (gases and liquids)
- Oximetry
- Flow of fluids
- Analysis of gases
- Measurement of volumes, flows, and pressures
- Capnography
- Electrical safety
- Measurement of temperature
- Fires and explosions

#### **Equipment and Apparatus**

- Equipment design and standards
- Devices to maintain the airway (laryngoscopes, endotracheal tubes, tracheostomy tubes, face masks, laryngeal masks, airways)
- Gas supply in bulk and cylinders
- Anaesthesia delivery system, including pressure valves and regulators

- Information systems
- Vaporisers
- Data storage and retrieval
- Breathing systems

### **Monitoring**

- Anaesthesia record
- Additional monitoring when appropriate (including central venous pressure, pulmonary artery pressure, cardiac output, cerebral function, temperature, coagulation, blood loss, blood sugar)
- Minimum monitoring standards

### **Education and Self-Development**

Trainees are required to understand the principles, processes or nature of:

- effective learning
- self-directed learning and self-assessment
- reasoning and decision-making
- giving and receiving feedback
- lifelong learning

### **Clinical Management**

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of uncomplicated patients (e.g. ASA 1 and 2). These include:

#### **Operating Theatre Suite Environment**

- Planning and physical layout of an operating theatre suite, especially the operating rooms and post-anaesthesia recovery room
- Principles of management of an operating theatre suite
- Informed consent
- Regulations relating to restricted drugs as per national or state guidelines
- Lighting, safety, and infection and pollution control in operating rooms
- Services and equipment in operating rooms and post-anaesthesia recovery room
- Principles of occupational health and safety such as lifting and positioning patients, infection control and sharps policies
- Requirements of other anaesthesia environments outside operating rooms
- Dealing with an intra-operative death or mishap
- Principles of staffing the operating room, including assistants to anaesthetists
- Relevant SASA professional documents

#### **Day Surgery Environment**

- Types of day surgery e.g. ambulatory surgery, same-day surgery, office-based surgery
- Services and equipment in a day surgery suite
- Principles of management of a day surgery suite
- Requirements of a day surgery facility
- Planning and physical layout of a day surgery suite
- Relevant SASA professional documents

#### **Professional Practice**

- Policies, recommendations and guidelines in professional practice as contained in professional documents.

#### **Preoperative Assessment**

- Pre-anaesthesia clinics
- Communication and consultation skills face-to-face, by phone and in writing
- Appropriate history taking

- Physical examination including airway assessment, respiratory, cardiovascular and neurological examinations
- Pulmonary function tests
- Measurement of cardiovascular function
- Referral to other specialists when necessary
- Interpretation of common radiology and imaging scans and investigations
- Establishment of a rapport with the patient to provide reassurance, disclosure of risk, information, and discussions on complementary medicine and informed consent
- Other investigations as appropriate

### ***Conducting Anaesthesia***

- Applied cardiac and respiratory physiology
- Application and interpretation of monitored variables and neuromuscular blockade
- Use of muscle relaxants
- Applied pharmacology and variability in drug response
- Application of mechanical ventilation
- Management of the airway and intraoperative complications outlined in “Drills” below
- Selection and planning of the anaesthesia technique
- Common regional anaesthesia techniques (e.g. epidural and spinal anaesthesia and upper limb blocks)
- Decision-making relating to postponement or cancellation of surgery
- Routine inhalation and intravenous inductions
- Maintenance of anaesthesia
- Maintenance of accurate records
- Correct use of anaesthesia delivery systems

### ***Postoperative Care***

- Safe recovery transport and handover in the post-anaesthesia recovery room
- Management of postoperative pain, fluid requirements, and nausea and vomiting
- Post-operative consultations

### ***Complementary Medicine***

- Common complementary or alternative medicine drugs and therapy
- Principles of acupuncture
- Interactions with drugs used in anaesthesia and analgesia
- Views of patients from different cultures on complementary medicine

## **Skills**

### ***Clinical Skills***

Trainees will provide safe anaesthesia care and pain management for uncomplicated patients undergoing non-major surgery.

In providing anaesthesia care, Trainees should be competent in certain technical skills, such as the following.

- Maintenance of an adequate airway
- Central venous cannulation
- Rapid sequence induction
- ECG recording and interpretation
- Advanced Life Support
- Lumbar puncture
- Aseptic techniques
- Blood culture collection
- Venous access
- Emergency management of a pneumothorax
- Arterial blood gas collection
- Arterial cannulation

Trainees should be familiar with clinical protocols (drills) in the delivery of safe anaesthesia care, and be able to respond accordingly for crisis management. These include the following.

- Checking of the anaesthesia delivery system
- Airway assessment
- Identification and management of the following problems, which are commonly acute and may be life-threatening:
  - Inadequate airway; failed intubation, obstructed airway, oesophageal intubation, endobronchial intubation, and unplanned extubation
  - Laryngospasm
  - Bronchospasm
  - Hypertension
  - Hypotension
  - Arrhythmias
  - Myocardial ischaemia
  - Hypoxia
  - Hypocarbia
  - Hypercarbia
  - Hypoventilation
  - Hyperventilation
  - Hypothermia
  - Hyperthermia
  - Malignant hyperthermia
  - Anaphylaxis
  - Residual neuromuscular blockade
  - Inadequate neuraxial blockade
  - Seizures
  - Gas embolism
  - High ventilator peak inspiratory pressures
  - Pulmonary aspiration
  - Pneumothorax

## **Professionalism**

Trainees are expected to develop the professionalism required for specialist medical practice as outlined:

### ***Specialist Practice***

- To attain the attributes of a specialist as a:
  - Medical expert
  - Communicator
  - Collaborator
  - Manager
  - Health advocate
  - Scholar and teacher
  - Professional
- To practise good communication with colleagues, patients and others
- To work as a member of a team, but to assume responsibilities and/or delegate duties as a team leader when necessary
- To commit to, and believe in, a culture of safety and ethical, high quality care
- To accept that medical knowledge and skills are not the only requirements of specialist practice
- To be aware of medicolegal obligations relating to medical practice
- To have insight into one's own limitations, abilities and areas of expertise
- To commit to lifelong continuing professional development

### ***Professionalism and Ethics***

To commit to, and believe in the ethical and professional principles of:

- Altruism: the best care for the patient must be the principal driving force of practice



- Patient autonomy: patients' ability to determine their treatment
- Beneficence: the principle of "doing good" to patients
- Non-maleficence: the principle of not doing harm to patients
- Fidelity: faithfulness to one's duties and obligations. This principle underlies excellence in patient care, confidentiality, telling the truth, a commitment to continuing professional development and lifelong learning, and not neglecting patient care
- Social justice: the right of all patients to be fairly treated
- Utility: the principle of doing the most good for the greatest number of people
- Duty to oneself in terms of personal health, and maintenance of competence to practise
- Accountability: the anaesthetist is responsible for his/her actions
- Honour and integrity in all conduct, including the generation and use of resources
- Respect for others, including a commitment to teamwork and conflict resolution
- Appropriate response to clinical error

#### ***Patient Considerations***

To commit to, and believe in, the rights of patients with respect to:

- Autonomy
- Confidentiality of the doctor-patient relationship
- Appropriate, excellent clinical care, including pre-operative assessment
- Informed consent
- Comprehension of the risks of anaesthesia techniques
- Appropriate care irrespective of race, culture, gender and socio-economic status

#### ***Research Considerations***

- To value rigorous educational and scientific processes
- To distinguish between practice with a sound scientific basis and that which requires further objective assessment
- To commit to the ethical principles of research

Basic sciences, clinical measurement, monitoring, and statistics will be assessed in the Primary Examination. Clinical management and clinical skills will be assessed in the Final Examination.

The Learning Portfolio is an integral tool for self-assessment (as well as for recording clinical experience and developing study plans). The Trainee is expected to self-evaluate his/her education skills and learning experience using the Learning Portfolio. For example, the Learning Portfolio should show the Trainee's progress through the Module, as records of technical skills learned, topics reviewed, and oral presentations delivered (*College of Anaesthetists Learning Portfolio guidelines*)

## Module 2 – Education and Scientific Enquiry

This module is to be taken concurrently with clinical modules.

### Aim

Trainees should acquire knowledge and skills in:

1. **Self-directed education and educational goals**
2. **Education and training of others**
3. **Planning and executing of a formal scientific enquiry**

### *During Basic Training*

- Maintaining a Learning Portfolio
- Developing a study plan for the rest of the training period
- Reviewing study plans and correcting for deviations (e.g., catching up on deficient knowledge or experience)
- Reflecting on previous learning experiences with the aid of the Learning Portfolio
- Linking basic science teaching with clinical practice
- Studying effectively
- Participating in small-group learning and educational activities
- Being aware of decision-making processes
- Managing time effectively for study, work and home/leisure
- Giving and receiving feedback
- Developing insight into personal limitations
- Using the Internet including email
- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Carrying out oral presentations and professional communication. Specific skills in communication are outlined in Modules 1, 2 and 3.

### Self-Directed Education and Educational Goals

#### Knowledge

- Academic requirements to achieve short and long term academic goals including all courses and degrees available to meet the requirements of professional bodies. Contractual obligations.
- Local, national and global sources of information
  - tutorials, courses and academic meetings
  - library and internet facilities
- Adult learning and continuing professional development: principles and available resources
- Importance of systematic review
- Creation of personal portfolio and its use in planning

#### Skills

##### *Educational Skills*

Trainees are expected to learn educational skills in Modules 1 to 3 that will enable them to develop the following:

- A review of their personal learning plan as specified in their Learning Portfolio
- Identification of the factors that lead to deviation from the original learning plan
- A learning plan in the Learning Portfolio in which basic science teaching is linked to clinical practice
- Information search and its critical appraisal
- Time management for learning
  - calendar based - course integration and exam preparation (e.g. dissertation)
  - clock based - organised personal study
- Appraising journal articles including application of statistics

- Applying the results of systematic reviews to clinical practice

### **Professionalism**

- Commitment to lifelong learning and professional development
- Appreciation of rigorous scientific process to information gathering before incorporation into clinical practice
- Ability to recognise unsubstantiated aspects of clinical practice
- Ability to repeatedly question his/her own clinical practices

### **Education and Training of Others**

#### **Knowledge**

- Students' academic requirements and goals
  - Availability of resources to achieve these goals
  - Any contractual obligations
- The various teaching and learning platforms available
  - Self-study
  - individualised clinical training (particularly Re. skills acquisition)
  - facilitated small group learning
  - small group tutorial teaching
  - lecture
- Recognition of different preferred learning styles between students
- The different methods of assessment, their strengths and weaknesses (e.g. MCQ, OSCE, short and long answer, written assignments etc.)
- Local exam systems and their requirements, access to past papers, administration
- Ethics of the teacher–learner relationship and confidentiality

#### **Skills**

- Teaching and facilitation skills through participation in the various platforms
- Course design, content delivery, and assessment by participation
- Oral presentation and professional communication

#### **Professionalism**

- Commitment to an active role in undergraduate and postgraduate education
- An active and enthusiastic communicator

### **Planning and Executing a Formal Scientific Enquiry**

#### **Knowledge**

- Principles of medical ethics for research including authorship and plagiarism
- Relationships between society, the institution, ethics committee, researcher, and subject
- Helsinki Declaration
- The research process, sources of error and their management
- Fundamentals of statistical treatment, commonly used tests and their application
- How to conduct a literature search
- Research designs, appropriate sampling methods, blinding
- Surveys, descriptive studies and Health Systems research
- How to conduct a systematic review
- Experimental design
- Writing a research proposal, including planned data analysis
- Funding, writing a grant application
- Data collection and storage, basics of database design and spreadsheets
- Data analysis, qualitative and quantitative comparisons and their interpretation
- Writing an abstract

- Writing a research article for publication
- Writing a dissertation
- Presenting your work at a meeting. Oral presentation, posters

### **Skills**

Skills associated with the above will be demonstrated by:

- Conducting and reporting (either by publication or dissertation) a research study
- Presenting the results of the study at either National or Faculty Conference
- Appraising journal articles at Departmental Journal Club and review presentation at Departmental weekly meetings

### **Professionalism**

- Valuing rigorous scientific process
- Commitment to an ethical basis for all research
- Commitment to lifelong professional development
- Ability to distinguish between habitual clinical practice and that driven by sound evidence, and to identify areas requiring further objective assessment.

This Module is to be taken concurrently with clinical modules. It considers the scope of professionalism as it pertains to three areas:

1. **Personal attributes** of a medical professional and specialist anaesthesiologist in the clinical context. Appropriate integration of professional and personal lives.
2. **Professionalism in practice** relevant to non-clinical management issues, including the place of Anaesthesia within the healthcare structures of the country and the avenues of career progress.
3. **Professionalism in management.** Facets of administrative, leadership, and management skills necessary for both a Provincial Department and Private Practice.

### Personal Attributes

These should be developed in the first year of training. The **trainee's aims** are to:

#### ***Become Expert*** in chosen fields of medicine and anaesthesia

- Achieve excellence in clinical practice
- Analyse, integrates and adheres to ethical care in clinical practice
- Maintain vigilance
- Recognise that patient safety is paramount

#### ***Be a Communicator***

- Strive to become an empathetic listener and communicator
- Understand your personality profile and the triggers of your different behaviours
- Establish effective relationships with patients, families, and colleagues in the healthcare system
- Resolve issues using sound ethical reasoning

#### ***Be a Collaborator***

- Demonstrate exemplary practice as a member of a multidisciplinary team by exercising flexible leadership, consultation and appropriate delegation
- Show respect for the expertise, diversity and concerns of other team members

#### ***Become a Manager***

- Manage patient care, departmental and personal issues effectively with patience, calm, good humour and insight
- Allocates and uses health care resources wisely
- Respect the views of others

#### ***Be a Health Advocate***

- Maintain personal health and well-being
- Promote health maintenance and occupational safety of patients, self and colleagues

#### ***Become a Scholar and Teacher***

- Value advances in scientific knowledge; identify and appraise them critically for incorporation into contemporary anaesthesia practice
- Enrich knowledge with wisdom
- Maintain life-long learning
- Acknowledge and learn from errors; value appraisal of performance
- Contribute to the education and training of students, postgraduate trainees and other health professionals

#### ***Be a Professional***

- Recognise that patient confidentiality is essential
- Comply with the relevant policies, recommendations, and guidelines in professional practice as contained in SASA Professional Documents
- Exhibit appropriate personal and interpersonal professional behaviours
- Value human diversity
- Deliver high quality patient care in a way that is consistent with ethical and medicolegal obligations of a medical specialist
- Conduct practice with integrity, honesty and compassion
- Accept peer determinations of clinical competence and professional capabilities

- Recognise and deal with personal and professional limitations
- Recognise the impaired physician and understand the processes and skills needed to rehabilitate colleagues

## Knowledge

Trainees are expected to understand the following.

- Professional attributes of a specialist
- Principles of medical ethics:
  - autonomy, beneficence, non-maleficence, equality, justice, fidelity, utility
- The Geneva Declaration
- The role of the Medical Board or Medical Council in protecting the public, and promoting good medical practice through the registration of medical practitioners
- Community notions of health, disease, and medical care
- Principles of communication with patients including:
  - rights and responsibilities of the patient, other staff, and the doctor
  - informed consent for anaesthesia
  - fee discussions related to the Reference Price list
  - patient confidentiality and privacy legislation
- Principles of communication with colleagues
  - methods (verbal, written, consultation or referral)
  - manner (courtesy, integrity, respect)
  - adequate record keeping (including medicolegal implications of inadequate documentation)
- Personal issues including:
  - choosing a general practitioner
  - balancing family and work, and the importance of non-professional activities
  - depression; recognition and care plans
  - substance abuse; protocols for recognition and access to appropriate referral
  - HPCSA protocols on dealing with the impaired physician
  - mentoring; types and their application, including limitations
  - leadership responsibilities and styles
  - team behaviours
  - stress and crisis management
  - conflict resolution
  - use and influences of role models
- Integrity

## Clinical Management

Trainees are expected to understand major professional issues in clinical practice below.

Professional issues are considered in full in Module 12.

- Relevant SASA professional documents
- Medicolegal obligations:
  - National Health Act
  - Council of Medical Schemes
    - PMB conditions
    - Account submission protocols
  - registration, recertification, credentialing
  - patient complaints
  - medical indemnity
  - law courts and coroners' courts
  - impaired colleagues
- Quality Assurance:
  - Principles
  - critical incident monitoring
- Resource allocation

## Skills

### ***Clinical***

Trainees are expected to integrate and demonstrate the application of the above knowledge to their clinical practice by:

- Application of medical ethics to clinical problem solving
- Appropriate care for patients irrespective of their race, culture, gender, social class, age, or other attributes
- Communication with patients and their relatives; for example, breaking bad news, diagnosing and explaining brain death, requesting organ donation
- Communication via an interpreter
- Effective communication with colleagues, for example, in handing over care, patient referral, consultation requests or assistance
- Maintenance of good anaesthesia and other records
- Implementation of quality assurance, for example, participating in critical incident monitoring
- Risk management
- Crisis management
- Conflict resolution
- Provision of leadership
- Supervision of junior staff in a supportive and professional manner
- Effective time management
- Ability to work as a member of a team, but to assume responsibilities and/or delegate duties as a team leader when necessary
- To commit to, and believe in, a culture of safety and ethical, high quality care
- To accept that medical knowledge and skills are not the only requirements of specialist practice
- To be aware of medicolegal obligations relating to medical practice
- To have insight into one's own limitations, abilities and areas of expertise

### **Attitudes and Behaviours**

Trainees are expected to develop attitudes and behaviours essential to specialist medical practice.

Core attitudes that Trainees must cultivate during the whole period of MMed/CASA training are outlined below.

#### ***Specialist Practice***

- To attain the above professional attributes of a specialist
- To practise good communication with colleagues, patients and others
- To work as a member of a team but to assume responsibilities and to delegate duties as a team leader when necessary
- To commit to, and believe in, a culture of safe and ethical, high quality care
- To accept that medical knowledge and skills are not the only requirements of specialist practice
- To be aware of medicolegal obligations relating to medical practice
- To have insight into one's own limitations, abilities and areas of expertise
- To commit to lifelong continuing professional development

#### ***Professionalism and Ethics***

To commit to, and believe in the ethical and professional principles of:

- *Altruism*: the best care for the patient must be the principal driving force of practice
- *Patient autonomy*: patients' ability to determine their treatment
- *Beneficence*: the principle of "doing good" to patients
- *Non-maleficence*: the principle of not doing harm to patients
- *Fidelity*: faithfulness to one's duties and obligations. This principle underlies excellence in patient care, confidentiality, telling the truth, a commitment to continuing professional development and lifelong learning, and not neglecting patient care
- *Social justice*: the right of all patients to be fairly treated
- *Utility*: the principle of doing the most good for the greatest number of people
- *Duty* to oneself in terms of personal health care, and maintenance of competence to practise
- *Accountability*: the anaesthetist is responsible for his/her actions
- *Honour and integrity* in all conduct, including the generation and use of resources
- *Respect* for others, including a responsibility to work as a team and to practise conflict resolution
- *Appropriate response to clinical error*

### **Patient Considerations**

- To commit to, and believe in, the rights of patients with respect to:
- Autonomy
- Confidentiality of the doctor-patient relationship
- Informed consent
- Comprehension of the risks of anaesthesia techniques
- Appropriate care irrespective of race, culture, gender and socio-economic status

### **Assessment**

Completion of Module 2 does not need to be validated by a Module Supervisor. However, the Professional Attributes Self-Assessment Test must be undertaken after completion of the Module, at any time during Basic Training. This web-based test assesses knowledge and understanding of education skills, attributes of a specialist anaesthetist, medical ethics, communication, attitudes, and professional practice issues. Evidence of completion must be included in the Learning Portfolio.

The Supervisor of Training and other Consultants will evaluate the Trainee's overall performance in the In-Training Assessment (ITA) process. Aspects of clinical performance, education skills, and attitudes will be reviewed. The ITA will remain a formative assessment conducted every six months, independent of module assessment.

Aspects of Knowledge and Clinical Management in Module 2 that are relevant to professional practice may be examined in the Final Examination.

The Learning Portfolio is an integral tool for self-assessment (as well as for recording clinical experience and developing study plans). The Trainee is expected to self-evaluate his/her education skills and learning experience using the Learning Portfolio. For example, the Learning Portfolio should show the Trainee's progress through the Module, as records of technical skills learned, topics reviewed and oral presentations delivered.

It covers the understanding of humanistic issues in professional practice and complements Module 13 *Professional Practice*.

### **Professionalism in Practice**

This to be undertaken during the final 2 years of training, in the course of normal clinical duties and concurrently with clinical Modules.

**The Trainee's Aims** are to understand relevant non-clinical management issues. These range from understanding the culture of the healthcare industry and the anaesthesia profession, to considering one's career development, combining learning, teaching, administration, professional activities with patient care, and integrating aspects of administration and management required for the smooth running of an Anaesthetic Department.

### **Learning Objectives**

This Module builds considers knowledge and skills in six components:

- Health infrastructures
- Administration and management
- Quality assurance
- Ethical, legal and indemnity issues
- Skills in professional practice
- Career and life planning

In Module 3, the Trainee will demonstrate:

- Knowledge of the relevant South African healthcare infrastructure at national, provincial and local levels, and the role of the Specialist Anaesthetist, SASA, and CASA and University Departments in its continuing improvement
- Capacity to work within the framework of anaesthesia departments through a comprehension of their structure and their processes
- Capacity to organise one's work and learning
- Capacity to organise local scientific meetings and research projects
- Comprehension of the legal obligations of professional practice in South Africa
- Understanding of ethical practice



- Communication skills in professional practice
- Commitment to lifelong quality assurance
- Understanding of a realistic life career plan

## **Knowledge**

### ***Healthcare Infrastructures***

The Trainee will understand the organisation, role, and function in South Africa of the following:

- The health system (public, private and managed care)
- Health care funding bodies
- Health insurance bodies
- HPCSA
- SAMA and its relationship with and obligations to HPCSA
- CMSA
- SASA
- Organisation of anaesthesia, public and private practice
- The place of the Pharmaceutical industry
- MCC
- Coding systems
  - ASA CPT™
  - SAMA Doctors' Guide to Billing
  - ICD10 Coding System
- Epidemiological issues relating to disease prevalence

### ***Administration and Management***

#### ***Professional Practice***

The Trainee will demonstrate an understanding of the principles and requirements of the following.

- Professional Documents
- Duties of an anaesthetist
  - Clinical services delivered
  - Policies on clinical practice, e.g., drug labelling and infection control
  - Teaching and research responsibilities
  - Staffing
  - Allocation of duties and rosters and resolution of related conflicts
  - Concept of clinical governance
  - Continuing professional development for staff
  - Budgeting relevant to a department
  - Scheduling of operating rooms for elective and emergency surgery, determining priorities of surgeons' requests, urgency of surgery, availability of anaesthetists, assistants and nurses, and appropriate work patterns
- Competence or professional assessment
- Minimum facilities for safe anaesthetic practice in operating suites
- Minimum facilities for safe anaesthetic practice outside operating suites (e.g., labour ward, day surgery unit, radiology department)
- Operations of a department of anaesthesia, intensive care and/or pain medicine:
  - Role of Director and Deputy Director
  - Role of Supervisor of Training
  - Role of Module Supervisor

#### ***Staffing***

The Trainee will demonstrate an understanding of the following principles:

- Determination of the required staff and establishment of a department, with relevance to the clinical and non-clinical workload of anaesthetists, secretarial and technical staff
- Concept of safe working hours
- Occupational safety standards
- Processes in appointing Consultants and Trainees
- Organisation of anaesthesia assistants in a department of anaesthesia
- Evaluation of staff performance
- Recognition of impaired performance in self and how to seek help

- Recognition of impaired performance in self and in colleagues:
  - Identification of indicators of impaired clinical performance due to physical, domestic or other stress, mental impairment, or substance abuse
  - Consideration of process of dealing with an impaired colleague
  - Plan for assessing performance of an allegedly impaired anaesthetist
  - Determination of risks of substance abuse in anaesthesia practice and how to reduce the risk
- Recognition of the Trainee with difficulties and the process of managing each individual

#### *Equipment*

The Trainee will demonstrate an understanding of the following principles.

- Mandatory equipment for conducting safe anaesthesia
- The anaesthesia delivery system
- Selection, ordering and maintenance of equipment
- Assessment of new and existing equipment for essential and desirable features, reliability, ease of maintenance, availability of parts, and durability
- Advantages and disadvantages of disposable/single use items
- Advantages and disadvantages of generic medicines

#### *Professional Committees*

The Trainee will understand and/or contribute personally to the following.

- SASA and professional committees in the Trainee's region
- Important hospital committees
- Rules of formal meetings
- Role of committee members

#### *Organisation of Clinical Scientific Meetings*

The Trainee will understand and/or contribute personally to the following.

- The value of clinical and scientific meetings and their organisational issues.
- Steps to stage a successful meeting
- Advantages and limitations of different types of sessions, e.g., oral and poster presentations, symposium, workshop etc.
- Role and qualities of a chairman of a scientific session
- Rules for the conduct of meetings

#### *Self-Organisation and Management*

The Trainee will understand the Requirements and processes of practising as a full or part time Consultant in a public institution:

- HPCSA Specialist Registration
- Malpractice insurance
- Income protection insurance
- Contractual obligations
  - Working hours
  - Overtime
  - Performance agreements
  - Leave and sickness
- Time management strategies in balancing clinical, administrative, teaching, research and learning commitments
- Computerised systems
- Retirement planning

#### *Quality Assurance*

- Principles of Quality Assurance
- Terms used, the processes, the measurement tools and the role of physicians in QA
- Interdisciplinary nature of QA
- Contribution by anaesthetists in relation to QA in healthcare
- Application of QA methods in clinical practice to find the standard of care, problems of care, corrective strategies and effectiveness of the strategies ("closing the loop")
- Risk management
- The approach of dealing with adverse events rather than individual performance errors
- Relationships between adverse events, system factors and human factors

- Literature searching, measurement and analysis in the QA process
- Evidence-based medicine and the Cochrane Collaboration
- Processes of managing change
- Critical Incident Monitoring

#### *Ethical, Legal & Indemnity/ Insurance Issues*

- Standards of care expected of a specialist
- Documents and guidelines on standards of care published by statutory bodies such as Medical Councils, Medical Protection Societies, and the codes of ethics of Medical Associations
- Obligations of medical practitioners under various statutes, e.g., Coroners Act
- Legal processes whereby patients can be compensated for injuries caused by medical treatment or negligence
- Legal processes whereby medical practitioners are held accountable for their actions (e.g., HPCSA)
- Standards for informed consent to all patients
- Legal processes regarding patient complaints and the anaesthetist's obligation to assist such patients
- Legal and ethical issues involved in dealing with colleagues who are unfit to practise, and the legal obligation to report such colleagues,
- Services provided by medical indemnity organisations in the relevant region
- Roles and powers of consumer and competition bodies
- Legal processes regarding sexual harassment
- Roles of an expert witness and witness of fact, and when to seek legal advice before appearing as a witness
- Steps to be taken if an adverse event is liable for legal action
- Obligations to notify statutory bodies of adverse events and the nature and presentation of the information required

#### **Skills**

Trainees need to develop non-clinical skills in professional practice. They will demonstrate an understanding of or skills in the following:

- Organising work, study, family, leisure in terms of time and commitment
- Developing a personal study plan, and using and building on the Learning Portfolio
- Recognising priorities in learning and tips in effective learning
- Organising duty rosters
- Organising continuing education meetings
- Chairing meetings
- Providing feedback of one's view and junior staff colleagues' views to Consultants
- Dealing with a Trainee with difficulties, an impaired colleague or troublesome Consultant
- Teaching nurses, junior medical staff, anaesthesia assistants and other allied health workers
- Developing communication skills such as:
  - Normal patient consultations regarding anaesthesia information, informed consent, and risks
  - Talking to and providing support to patients and relatives after adverse events
  - Consultations with other medical and professional colleagues
  - Communications with Operating Suite and ward staff
  - Oral presentations of professional topics
  - Giving and receiving feedback
  - Issuing orders to team members, especially in emergencies
  - Writing skills, e.g., minutes and letters of referral
- Good record keeping, e.g., anaesthesia patient charting, adverse event, Learning Portfolio
- Dealing with an adverse event and aftermath rehearsals
- Drafting budgets, professional and personal
- Keeping track of one's career plans
- Maintaining ethical professional standards in the roles as a medical expert, communicator, collaborator, manager, researcher, teacher and health advocate
- Developing skills in print, radio and television media; different presentations, their relative effectiveness, and how to present them

#### **Career and Life Planning**

As Trainees approach the end of their training program, they should:

- Review plans developed in Module 3 and update the plans in their Learning Portfolios
- Consider the next career step after conferment of FCA/MMed

- Consider expected and contingency plans for a series of normal life events, e.g., investments, life insurance and disability insurance

## **Attitudes and Behaviours**

Trainees are expected to develop the attitudes and behaviours which are obligatory in specialist medical practice.

### **Assessment**

Completion of Module 3 does not need to be validated by a Module Supervisor. However, self-assessment of Module 3 is mandatory, using the web-based Professional Practice Self-Assessment Test. This MCQ test is undertaken after completion of Module 3. Evidence of passing this self-assessment test must be included in the Learning Portfolio.

The Supervisor of Training and other Consultants will evaluate the Trainee's overall performance in the In-Training Assessment (ITA) process. Aspects of clinical performance, education skills, and attitudes will be reviewed. The ITA will remain a formative assessment conducted every six months, independent of Module assessment.

Aspects of Module 3 that are relevant to professional practice may be examined in the Final Examination.

## **Professionalism in Management**

The aim of this arm of Module 3 is for Trainees to understand the application of the other two arms of professionalism to Private Practice and to incorporate elements of ethical and professional business practice.

### ***Organisation and Business Management of Individual Practice***

The Trainee will understand the organisation and management of a medical practice such as the following.

- Requirements of entering private practice
  - HPCSA rulings
  - Board of Health Care Funders
  - Council of Medical Schemes
  - National Health Act w.r.t. regulations to fee discussions
  - National Credit Act
- Principles of business management
  - Accounting
    - Budgets
    - Cash Flow
    - Balance sheet
    - Income and expenditure
    - Data collection and generation of reports
    - Prevention of fraud
    - Credit control
  - Taxation planning
    - VAT
    - Provisional tax
    - PAYE
    - Regulations re tax relief on pension contributions, travel and subsistence allowances etc.
  - Income protection insurance
  - Staff employment
    - Basic conditions of employment
    - Labour Act
    - Appraisals
    - Disciplinary issues
    - Unions and labour relations
  - Group / Associate / Sole practice
  - Computerised systems and practice management software
  - Retirement planning
- Time management strategies in determining methods of practice management
- Paid and pro bono work in the profession



## **Trainee's Aims**

This Module relates to clinical experience in anaesthesia for major elective, emergency and trauma surgery, including gastrointestinal and hepatobiliary surgery, laparoscopic surgery and the perioperative care of trauma patients.

The **aim of Module 4** is for Trainees to acquire clinical abilities and skills in managing complex, high-risk, and injured patients, and those with co-existing medical conditions that are relevant to anaesthesia, and to build on what they learned in Module 1. This includes learning to integrate and apply knowledge and skills in clinical management.

## **Knowledge**

### ***Basic Sciences***

Trainees are required to review and build on the relevant subjects in the Basic Sciences and to apply Basic Science principles in clinical practice.

### **Clinical Management**

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of patients for major and trauma surgery:

#### ***Specific Professional Practice & Ethical Considerations***

- Consent for the incompetent patient
- Relevant statutory regulations relating to surrogate consent
- South African Acts of Parliament related to child protection
- Ethical, professional and legal issues surrounding the "Good Samaritan"
- Ethical issues surrounding triage and resource management

#### ***Anaesthesia for High-risk Elective and Emergency Surgery***

- Preoperative evaluation and resuscitation
- ASA grading system and outcomes
- Regional anaesthesia for abdominal, vascular, and imaging procedures including anatomy, and physiological and pharmacological aspects
- Postoperative care
- Thromboembolism prophylaxis
- Informed consent and consent for incompetent patients
- Perioperative and prophylactic antibiotics
- Management of postoperative pain, phantom-limb pain and pain from injury
- Management of coagulopathies

#### ***Anaesthesia for Trauma Surgery***

- Principles of Triage, assessment and immediate care; primary and secondary survey
- Trauma severity scores
- Emergency airway management
- Establishing intravenous access
- Priorities of resuscitation, investigations, and surgical procedures
- Concept, definition and role of damage control surgery
- Physiological & biochemical effects of trauma
- Thermoregulation
- Managing facial, head and cervical and spine injuries
- Glasgow Coma Scale and other scores of consciousness
- Pathophysiology of head injury including changes in cerebral blood flow, cerebral metabolism and intracranial pressure
- Pathophysiology and management of shock
- Pathophysiology of blood loss and massive blood transfusion
- Volume replacement including evidence based on subsequent outcome
- Managing abdominal and chest injuries
- Management of burns procedures, including:
  - Understanding the pathophysiology of burns
  - Anaesthesia for debridement and skin grafting
  - Anaesthesia for change of dressing

- Managing coagulopathies & blood conservation strategies
- Organisation of trauma and retrieval services
- Importance of early ICU referral and consultation, knowledge of local ICU admission criteria
- Transport of ventilated or injured patients including portable ventilators and monitoring systems:
  - From scene to hospital
  - To theatre
  - Theatre to ICU

## **Skills**

### ***Clinical Skills***

In this Module, Trainees will provide safe anaesthesia for:

- Major abdominal surgery
- Laparoscopic surgery
- Trauma surgery
- Burns

Trainees will revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient's status.

Trainees are required to be competent in the following technical skills.

- Skills learned in Module 1, especially securing an airway, arterial and central venous cannulation, and rapid sequence induction
- Cricothyroidotomy and percutaneous tracheostomy
- Cannulation of major vessels for volume resuscitation
- Awake fiberoptic intubation
- Thoracic and lumbar epidural and spinal anaesthesia
- Blood salvage and conservation
- Regional nerve blocks for abdominal and lower limb surgery
- Chest drain insertion
- Immobilisation and care of cervical spine injuries
- Use and interpretation of central vascular monitoring, including the cardiac output monitor

Trainees should be familiar with clinical drills for crises management. These include:

- Drills in Module 1, especially for airway emergencies e.g., "cannot intubate, cannot ventilate", difficult airway, hypoxia and abnormal end-tidal CO<sub>2</sub> levels
- Managing major intraoperative events in aneurysm and abdominal surgery
- Drill for the primary and secondary survey
- Drill for raised intracranial pressure
- Drill for tension pneumothorax
- Drill for managing severe haemorrhage
- Drill for managing cardiac arrest (ACLS Algorithm)
- Drill for managing malignant hyperthermia

### Trainee's Aims

In Module 5 clinical experience is gained from anaesthesia and analgesia for labour and procedures for pregnant patients.

The **aim of Module 5** is for Trainees to acquire a series of clinical abilities and skills in obstetric anaesthesia and analgesia, such as the ability to:

- Provide safe general and regional anaesthesia and perioperative care for obstetric patients
- Conduct pain management during labour
- Use technical and anaesthesia skills and carry out established clinical drills and protocols relevant to obstetric anaesthesia and analgesia
- Apply knowledge of physiology, pharmacology, clinical measurement and monitoring
- Establish a professional team approach with obstetricians and midwives

### Learning Objectives

These are what the Trainee needs to learn. They are presented as:

- Knowledge
- Clinical management that applies knowledge and clinical skills to manage the patient
- Skills (clinical and technical)
- Attitudes and behaviours

### Knowledge

#### Basic Sciences

Trainees are required to review the relevant subjects in the Basic Sciences relevant to pregnancy and parturition.

#### Clinical Management

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in obstetric anaesthesia and analgesia care. These include the following:

#### *Specific Professional Practice & Ethical Considerations*

- Current PMCT and ARV protocols
- local requirements for notification of maternal mortality
- Clinical governance issues pertaining to QA assessment of labour and delivery units
- Ethical and legal considerations relating to Termination of Pregnancy, e.g. age of consent, rights of the unborn child, the role of the parents, courts, and other surrogate consent issues
- Ethical arguments surrounding competency of the labouring woman vis à vis consent

#### *Professional Documents*

NCCEMD Guidelines for Maternity Care in South Africa: **"Anaesthesia for Caesarean Section"**

SASA guidelines: **Section VI: Major Regional Anaesthesia**

NICE Guidelines: **Intrapartum care**

#### *Principles of Obstetrics*

- Anatomy — airway, spine, pelvis, birth canal, gravid uterus, and neurovascular supply
- Ecbolics and tocolytics
- Principles of in-vitro fertilisation
- Drugs used for fertility support and IVF (not detailed)
- Antenatal care
- Labour and delivery
- Maternal monitoring during labour
- Caesarean section; indications and levels of urgency
- Abortions and septic abortions
- Postpartum period

#### *High-risk Obstetrics*

- Poor medical, obstetric or anaesthesia history



- Pre-existing disease in pregnancy
- Substance abuse during pregnancy
- Pre eclampsia and eclampsia pathophysiology and management, including HELLP syndrome and ICU management
- Specific conditions related to local epidemiology, e.g. HIV/AIDS, tuberculosis, rheumatic heart disease
- Obstetric complications, e.g., breech, malpresentation, multiple pregnancy, abnormal placentation, and abruptio placentae
- Obstetric interventions; indications and anticipation of anaesthesia and analgesia
- Amniotic fluid, air and pulmonary embolism, pathophysiology and management
- Obstetric haemorrhage, antepartum, peripartum and postpartum
- Management of the pregnant patient on ICU

#### ***Foetal and Neonatal Considerations***

- Foetal teratogenicity, carcinogenicity, and congenital abnormalities (not detailed)
- Foetal evaluation and monitoring
- Antepartum and intrapartum foetal compromise
- Foetal death in utero; pathophysiology and psychological issues
- Neonatal resuscitation
- Apgar score and neuro-adaptive scores, and their prognostic significance
- Intrauterine and neonatal surgery, exit procedures

#### ***Anaesthesia Management***

- Pre-anaesthesia assessment of the pregnant patient and identification of high risk patients:
  - Risk factors in anaesthesia
  - Pre-existing diseases, e.g., cardiac disease, hypertension, respiratory disease, diabetes, thyroid disease, intracranial disease, bleeding disorders, renal disease and neuromuscular disease
  - Adolescent or elderly primigravid pregnancy
  - Morbid obesity
  - Thromboembolic disease
  - AIDS, PTB, sepsis
- Anaesthesia for non-obstetric surgery in the pregnant patient
- Anaesthesia for elective obstetric procedures
- Anaesthesia for emergency obstetric procedures
- Anaesthesia for Caesarean section
- Pain management in obstetrics, postoperative analgesia, epidural mythology, recognition of complications
- Complications of general anaesthesia
  - Difficult airway management
  - Pulmonary aspiration
  - Awareness during general anaesthesia
  - Complications of regional analgesia and anaesthesia, e.g., high block, local anaesthetic toxicity, neurological sequelae
  - Management of inadequate or failed regional anaesthesia and analgesia
- Management of severe haemorrhage; surgical, antepartum and postpartum
- Maternal morbidity and mortality; incidence and legal and ethical issues
- Cultural considerations; relevance of patient, family and staff with different ethnic backgrounds
- Organisation of an obstetric anaesthesia and analgesia service
- Complementary and alternative medicine; significance in obstetric practice and anaesthesia care
- Safe radiation practice during pregnancy

## **Skills**

### ***Clinical Skills***

In this Module, Trainees will provide safe anaesthesia for pregnant patients.

Trainees will revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient's status.

Technical skills in which Trainees are required to be competent include the following:

- Airway assessment in pregnancy
- Skills learned in Modules 1 and 2
- Rapid sequence induction
- Emergency airway management, including fiberoptic intubation
- Implementing epidural, spinal, and combined spinal/epidural anaesthesia and analgesia,
- Epidural blood patch
- Management of local anaesthetic toxicity
- Management of high regional block
- Management of severe obstetric haemorrhage

Trainees should be familiar with clinical drills for crises management. These include:

- Drills in Module 1, especially for airway emergencies
- Failure to intubate / Failure to ventilate algorithm in obstetrics
- Advanced Life Support in the obstetric patient
- Resuscitation of the neonate
- Management of pulmonary aspiration during general anaesthesia
- Use of the Patient Simulator Laboratory for staged emergency management

## Module 6 – Anaesthesia for Cardiac, Thoracic and Vascular Surgery

## **Trainee's Aims**

In Module 6 clinical experience is gained from anaesthesia for cardiac, thoracic and vascular surgery.

The **aim of Module 6** is for Trainees to acquire a series of clinical abilities and skills in the perioperative care of patients undergoing such surgery. These include conducting or assisting in anaesthesia and perioperative care for:

- Surgery on the heart, pericardium, coronary arteries and cardiac valves
- Surgery on great vessels
- Procedures requiring anaesthesia in cardiac catheterisation labs (paediatric and adult)
- Cardioversion
- Bronchoscopy
- Surgery on the lung, mediastinum, oesophagus and trachea
- Peripheral vascular surgery
- High risk patients for non cardiac surgery
- Risk assessment
- Vascular trauma-major resuscitation, equipment (cell salvage, level 1) and methods

## **Learning Objectives**

These are what the Trainee needs to learn. They are presented as:

- Knowledge
- Clinical management that applies knowledge and clinical skills to manage the patient
- Skills (clinical and technical)
- Attitudes and behaviours

## **Knowledge**

### ***Basic Sciences***

Trainees are required to revise the relevant subjects in the Basic Sciences and to apply Basic Science principles in clinical practice.

## **Clinical Management**

Trainees are expected to understand relevant principles, apply knowledge in practice, and demonstrate abilities in cardiac, thoracic and vascular anaesthesia. These include the following:

### ***Professional Practice***

- Understanding of the organization of an anaesthesia service for cardiothoracic surgery

### ***Cardiac Evaluation***

- Assessment for cardiac and non- cardiac surgery
- Pathophysiology, investigation, diagnosis, anaesthesia implications, and management of:
  - Ischaemic heart disease and associated perioperative risk factors
  - Congenital heart disease
  - Valvular heart disease
  - Hypertension
  - Cardiac arrhythmias
  - Other acquired diseases, e.g., myxoma, cardiomyopathy, pericarditis

### ***Anaesthesia and Perioperative Care for Patients with Cardiac and Vascular Disease for Non-cardiac Surgery***

Understanding the principles of anaesthesia and perioperative care for patients with:

- Recent myocardial infarction
- Ischaemic heart disease
- Cardiac valvular lesions
- Congenital heart disease, corrected and uncorrected
- Hypertensive disease
- Cardiac arrhythmias
- Other acquired diseases, e.g., myxoma, cardiomyopathy
- Cerebrovascular disease
- Peripheral vascular disease
- HIV vasculopathies and aneurysms

- ARV induced accelerated atherosclerosis
- Pericarditis

### ***Anaesthesia and Perioperative Care for Cardiac and Vascular surgery***

Understanding the principles, role, and management of procedures, problems, or events associated with anaesthesia for cardiac and vascular surgery, including:

- Myocardial protection
- Cerebral protection
- Spinal cord protection
- Blood coagulation and anticoagulation
- Perioperative arrhythmias
- Poor cardiac output states
- Temperature management (including deep hypothermic circulatory arrest)
- Cardiopulmonary bypass including weaning from bypass and ECMO
- Cross-clamping of the aorta
- High volume resuscitation
- Glycaemic control
- Antiarrhythmics
- Vasopressors and inotropes

### ***Anaesthesia for Cardiac Surgery***

Understanding the anaesthesia, complications and perioperative care (including analgesia) of:

- Coronary revascularisation with/without cardiopulmonary bypass
- Valvular repair or replacement
- Emergency cardiac surgery
- Cardioversion
- Procedures in the cardiac catheterisation laboratory
- Electrophysiological procedures
- Congenital heart disease surgery (paediatric and adult)
- Procedures on the great vessels, e.g., aortic dissection
- Heart or heart/lung transplantation

### ***Anaesthesia for Vascular Surgery***

Understanding the anaesthesia, complications and perioperative care (including analgesia) of:

- Surgery on the vessels supplying the head and neck
- Surgery on the abdominal vessels
- Surgery on the limb vessels
- Minimally invasive procedures on the vessels (e.g., intraluminal stenting)

### ***Anaesthesia for Organ Transplantation***

Including:

- Legal and ethical considerations of organ harvesting and transplantation
- Brain death and the legal definition of death
- Physiological and pharmacological considerations
- Protocols and planning

### ***Anaesthesia for Patients with Pulmonary Disease***

Reviewing and integrating with patient care:

- Respiratory physiology
- Chronic respiratory disease, pathophysiology, diagnosis and management
- Preoperative evaluation of patients with respiratory diseases
- Lung function tests
- Thoracic trauma

### ***Anaesthesia and Perioperative Care (including Analgesia) for Thoracic Surgery***

- Preoperative assessment for fitness for lung surgery and one-lung ventilation
- Understanding the principles, applied basic sciences, and management of anaesthesia and perioperative care for:
  - Thoracotomy and

- Lung resection, including pneumonectomy and lung reduction surgery
  - Mediastinal mass resection
  - Oesophageal surgery
  - Surgery on the thoracic aorta
- One-lung anaesthesia, including management of hypoxia and ventilation
- Differential lung ventilation
- Tracheal and bronchial surgery (including use of lasers and stents)
- Thoracoscopic procedures
- Bronchoscopy, including removal of foreign body
- Mediastinoscopy
- Lung or heart/lung transplantation
- Management of problems or critical events such as:
  - Fluid management post-pneumonectomy
  - Cardiac herniation post-pneumonectomy
  - Bronchopleural fistula
  - Lung bullae and cysts
  - Tension pneumothorax
  - Superior vena cava obstruction
  - Empyema
  - Understanding the types and uses of endotracheal, double-lumen, and endobronchial tubes and bronchial blockers
  - Understanding chest tube drainage systems and suction

### **Skills — Clinical Skills**

In this Module, Trainees will provide safe anaesthesia for cardiac, thoracic and vascular surgery. Trainees will revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient's status.

Technical skills in which Trainees should be competent include the following.

- Skills learned in Modules 1 and 2
- Fiberoptic bronchoscopy
- Placement and use of vascular monitoring lines (arterial, central venous, pulmonary artery, and femoral and neck vessels)
- Basic trans-oesophageal echo examinations (subject to local practices)
- DC defibrillation and cardioversion
- Use of cardiac pacemakers
- Use of epidural analgesia, intercostal nerve blocks and other regional techniques for managing postoperative pain
- Placement of endobronchial tubes and blockers
- Use of bougies and tube exchangers
- Interpretation of ECGs and ECG monitoring
- Interpretation of chest x-rays and common chest CT and MRI imaging films

### **Module 7 – Anaesthesia for Neurosurgery**

- Assistance with cardiopulmonary bypass
- Placement and care of chest drains and appropriate use of suction

## **Trainee's Aims**

In Module 6 clinical experience is gained from anaesthesia for neurosurgery.

The **aim of Module 6** is for Trainees to acquire a series of clinical abilities and skills in the perioperative care of patients undergoing neurosurgery and related surgery. These include conducting or assisting in anaesthesia and perioperative care for:

- Neurosurgery
- Spinal surgery
- Neuroradiological procedures
- Head injuries

## **Learning Objectives**

### **Knowledge**

#### ***Basic Sciences***

Basic science subjects relevant to this Module include:

- Neuro anatomy
  - Central nervous system
  - Spinal cord and meninges
  - Ventricular system and flow of CSF
  - Blood supply to brain and spinal cord
  - Cranial vault and spinal column
- Cerebral blood flow
- Cerebral blood volume
- Cerebral metabolism
- Cerebrospinal fluid dynamics and physiology
- Intracranial pressure
- Blood-brain barrier
- Physiological and metabolic effects of anaesthesia on brain and spinal cord
- Abnormal water and sodium homeostasis
- Nociception
- Temperature and CNS function
- Pituitary physiology
- Physiology and metabolism of normal and abnormal brain and spinal cord
- Pharmacology relevant to neuroanaesthesia:
  - Sedatives
  - Anticonvulsants
  - Hypnotics
  - Analgesics
  - Inhalation agents
  - Neuromuscular blocking drugs
  - Anticholinesterases
  - Neuroprotection
  - Diuretics
  - Hypotensive agents
  - Vasopressors
  - Corticosteroids
- Drug interactions with neuromuscular disorders

#### ***Clinical Measurement and Monitoring***

Trainees are required to understand the principles of clinical measurement and monitoring in neuroanaesthesia, including techniques and clinical importance. Knowledge is expected in:

- Haemodynamic and respiratory monitoring
- Cerebral blood flow
- Intracranial pressure (ICP) and cerebral perfusion pressure
- Cerebral metabolism
- Precordial / transoesophageal Doppler ultrasonometry (air embolism detection in sitting patients)
- Transcranial Doppler ultrasonometry

- Electrophysiological monitoring, e.g., electroencephalogram and evoked potentials
- Electrical safety standards

### ***Education and Self-Development***

Trainees are required to understand the education and self-development principles learned during Modules 1, 2 and 3, especially those of adult learning, self directed learning, and lifelong learning, and maintain their Learning Portfolio.

### **Clinical Management**

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of patients for neurological and spinal surgery. These include:

### ***Professional Practice***

- Understanding principles of:
  - Organisation of a neurosurgical anaesthesia service including a trauma anaesthesia service and a neuroradiological and imaging anaesthesia service
  - Intensive Care and High-Dependency Units for neurological patients

### ***Interventions to Minimise Cerebral Damage***

- Principles of cerebral protection
- Haemodynamic stability
- Fluid and osmotic therapy
- Management of intracranial hypertension
- Sedation and ventilatory support

### ***Anaesthesia for Neurosurgery***

- Understanding the underlying pathology and pathophysiology, assessment, anaesthesia and perioperative care of patients for:
  - Intra cerebral vascular surgery
  - Extra cerebral vascular surgery (more appropriately covered in module 6)
  - Supratentorial surgery
  - Stereotactic Neurosurgery
  - Posterior fossa surgery
  - Pituitary surgery
  - Epilepsy surgery
  - 'Awake craniotomy'
  - Craniofacial and craniobasal surgery
  - Spinal surgery
  - Emergency spinal cord decompression
  - Neonatal neurosurgical emergencies (neural tube defects)
  - Paediatric neurosurgery (see Module 8)
  - Procedures for the management of chronic pain (see Module 10)
  - Procedures for hydrocephalus
  - Intracranial sepsis
  - Imaging and interventional radiological procedures
- Principles, role and management of procedures, problems, or events associated with anaesthesia for neurosurgery:
  - Positioning for neurosurgery
  - Use of inhalation or total intravenous general anaesthesia
  - Induced hypotension
  - Induced hypertension
  - Hypothermia
  - Sitting position
  - Air embolism; precautions, diagnosis and management
  - Injury of head, spinal column and neurological injuries
  - Epilepsy and other neurological disorders
  - Subarachnoid haemorrhage and vasospasm.
  - Paediatric considerations

### **Skills — Clinical Skills**

In this Module, Trainees will provide safe anaesthesia for neurosurgery.

Trainees will revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient's status.

Technical skills in which Trainees are required to be competent include:

- Skills learned in Modules 1 and 2
- Pre-anaesthesia preparation for neuroanaesthesia
- Monitoring in neuroanaesthesia – setting up and calibration, placement of cannulae, interpretation of variables
- Post-anaesthesia care and post neurosurgical care
- Protocols and drills for:
  - Failed airway intubation
  - Reducing raised ICP
  - Suspected cervical spine injury
  - Intraoperative air embolism
  - Initial management of a head injury
  - Positioning of patients



This Module includes anaesthesia for ear-nose-throat (ENT), eye, dental, maxillofacial, plastic and craniofacial surgery. Clinical experience may be undertaken at times appropriate to the rostering duties of the training institution. As the subspecialties are different, this Module need not be undertaken as a continuous block.

### Trainee's Aims

In Module 8 clinical experience is gained from anaesthesia for above-mentioned surgical sub-specialties.

The **aim of Module 8** is for Trainees to acquire a series of clinical abilities and skills in the perioperative care of patients undergoing such surgery. The subspecialties in this Module have a number of common considerations in anaesthesia care, such as comorbidities and an increased need for preoperative airway assessment, an airway shared with the surgeon, high risks for airway obstruction intra and post operatively, mix of adult and paediatric patients, requirements for induced hypotension in certain procedures, and acute post-operative care problems. It may not be possible to obtain experience in all the above subspecialties, but the Trainee needs to understand the pathophysiology of the condition and the requirements of anaesthesia for surgery on the head and neck.

### Knowledge

Trainees are required to revise the relevant subjects in the Basic Sciences. Trainees are expected to apply Basic Science principles in clinical practice. Basic science, clinical measurement and other subjects relevant to this module include the following.

- Professional documents and guidelines for practice such as SASA sedation guidelines
- Relevant aspects of cardiovascular, respiratory and neurological physiology
- Physiology of gases in closed body cavities
- Pharmacology of local anaesthetic
- Pharmacology of local vasoconstrictors
- Anatomy of the head and neck and abnormal facies
- Anatomy of the airway, nasal passages, larynx, pharynx and middle ear including sensory innervation
- Effects of surgery and radiation on the airway
- Monitoring in anaesthesia
- Neurological monitoring
- Lasers; types, uses in surgery, complications and precautions
- Airway devices and types of tracheal tubes, e.g., Pollard, Rae agents
- Equipment for difficult tracheal intubation
- Equipment for jet ventilation
- Difficult airway algorithm

### Clinical Management

#### *Anaesthesia for ENT Surgery*

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of ENT surgery. These include the following.

- Pre-operative airway assessment
- Examination under anaesthesia
- Tonsillectomy and adenoidectomy, including quinsy and postoperative bleeding
- Microlaryngoscopy
- Radical head and neck surgery
  - Laryngectomy
  - Pharyngolaryngectomy
- Laser surgery including fire hazards
- Nasal and sinus operations
- Parotid tumour surgery
- Myringoplasty
- Middle ear surgery
- Microsurgery of the ear
- Managing partial airway obstruction including:
  - Epiglottitis
  - Foreign bodies
  - Laryngeal papilomas
  - Laryngeal tumours

- Oropharyngeal cysts and abscesses
- Elective and emergency tracheostomy
- Paediatric problems, e.g., relating to disease, airway, larynx and craniofacial disorders
- Post-operative care

### ***Anaesthesia for Dental Surgery***

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of dental surgery. These include the following.

- Outpatient dental procedures; sedation and general anaesthesia
- Inpatient dental surgery
- Dental procedures on the mentally handicapped
- Dental procedures on patients with bleeding disorders
- Oral surgery
  - Fractured jaw
  - Maxillary fractures according to the Le Fort classification
  - Dental sepsis
- Cardiac Disease

### ***Anaesthesia for Eye Surgery***

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of eye surgery. These include the following.

- Understanding:
  - Anatomy and physiology of extremes of age
  - Anatomy of orbit and contents
  - Physiology of intraocular pressure
  - Ocular perfusion
  - Eye reflexes (oculocardiac, oculo-respiratory, oculoemetic)
  - Anatomy of orbit, extraocular muscles, blood vessels, lachrymal apparatus
  - Local anaesthetic agents for eye surgery
  - Other drugs for eye surgery, e.g., topical agents, vasoconstrictors, mydriatics, miotics, and agents to reduce intraocular pressure
- General anaesthesia for eye surgery including:
  - Examination under anaesthesia
  - Laser eye surgery
  - Intraocular surgery
  - Extraocular surgery
  - Retinal detachment
  - Plastic and orbital surgery
  - Emergency eye surgery and use of suxamethonium in penetrating eye injury
  - Monitoring
  - Postoperative care, management of nausea and vomiting
- Principles of regional retrobulbar and peribulbar block and choosing between general and regional anaesthesia techniques
- Sedation for eye procedures
- Principles of anaesthesia for day-case or office-based eye surgery –
- Paediatric considerations

### ***Anaesthesia for Maxillofacial, Thyroid, Plastic and Cranio-Facial Surgery***

Trainees are expected to understand relevant principles, apply knowledge in practice, and to demonstrate abilities in the anaesthesia management of maxillofacial and head and neck surgery. These include the following.

- Pre-operative airway assessment including assessment for mask ventilation, intubation and surgical airway access
- Management of anaesthesia for major maxillofacial surgery, which may involve prolonged anaesthesia, major blood loss, hypothermia and multiple procedures
- Management of anaesthesia for facial trauma: emergency and semi-elective, including fractured jaw and maxilla
- Management of a wired jaw or a mouth with limited opening
- Management of anaesthesia for cancer, plastic and cosmetic surgery on the face, head and neck, including surgery for cleft palate
- Management of flaps to the head and neck regions

- Management of thyroid surgery, including:
  - Anaesthesia for thyroid and parathyroid surgery
  - Stabilisation of thyroid and parathyroid disorders preoperatively
  - Drill for managing post thyroidectomy bleeding
  - Drill for managing a “thyroid storm”
- Sedation for head and neck procedures
- Post-operative care

## **Skills**

### ***Clinical Skills***

In this Module, Trainees will provide safe anaesthesia for varied surgery and procedures on the head and neck.

Trainees will revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient’s status.

Technical skills common to all procedures that Trainees are required to be competent in include the following.

- Skills learned in Modules 1 and 2
- Tracheal intubation
  - Nasal intubation including techniques of blind nasal intubation
  - Use of special tubes
  - Placement and removal of packs
- Applying topical local anaesthesia to the airway
- Securing the difficult airway
  - Recognising the high-risk airway
  - Use of stylets and bougies
  - Local and topical anaesthesia techniques of the airway
  - Awake intubation
  - Retrograde catheter technique
  - Fiberoptic intubation
  - Laryngeal mask airway intubation
  - Failed intubation or ventilation drill
  - Cricothyroidotomy and percutaneous tracheostomy
  - Transtracheal ventilation
  - Managing the airway in trauma and burns
- Upper airway obstruction drill
- Post extubation of difficult airway drill
- Spontaneous gaseous induction for airway obstruction

## **Module 9 – Paediatric Anaesthesia**

- Regional and local anaesthesia of the head and neck
- Management of postoperative nausea and vomiting in head and neck surgery
- Management of postoperative facial and airway swelling

## **Trainee's Aims**

In Module 9 clinical experience is gained from participating in anaesthesia for paediatric patients.

The **aim of Module 9** is for Trainees to acquire a series of clinical abilities and skills in the perioperative and peri-anaesthetic care of paediatric patients. These include:

- Conducting or assisting in anaesthesia and peri-operative / peri-anaesthetic care for emergency and elective anaesthesia for patients in all paediatric age groups, including adolescents
- Recognising the skills and facilities required for various procedures in children of various ages and with various medical conditions
- Demonstrating paediatric and neonatal resuscitation skills

## **Knowledge**

### ***Basic Sciences***

Trainees are required to revise the relevant subjects in the Basic Sciences. Trainees are expected to apply Basic Science principles in clinical practice.

Basic Science subjects relevant to neonates, infants and older children include the following.

- Anatomy relevant to airway management and breathing
- The physiology of respiration, circulation, fluid balance and thermoregulation
- The pharmacology of anaesthetic agents, analgesics and common paediatric medications, especially the relationship of dose to the size/maturity of child
- The relevance of surface area of children of various ages

### ***Considerations for Paediatric Anaesthesia***

- Stages of development of the normal child and their relevance to hospitalisation
- General principles of perioperative management relevant to children, emphasising:
  - common childhood illnesses and their influence on anaesthesia and surgery
  - fasting guidelines
  - fluid and electrolyte replacement
  - temperature control
  - specialised equipment for children of different sizes
  - perioperative monitoring
  - dosage and administration of emergency drugs
  - postoperative apnoea detection, causes, monitoring, risk factors, management
  - acute and persistent pain management
  - Paediatric day case surgery
- Relevant features of important childhood conditions, particularly:
  - respiratory infections including PTB, bronchiolitis
  - asthma
  - prematurity and its complications
  - facial anomalies affecting the airway
  - neonatal emergencies; especially respiratory distress, tracheo-oesophageal fistula, congenital diaphragmatic hernia, necrotising enterocolitis, abdominal wall defects, ROP, IVH, PDA, NEC
  - other childhood emergencies; especially inhaled/ingested foreign bodies, fractures, head injuries and burns
  - congenital cardiac disease; especially ASD, VSD, Tetralogy of Fallot
  - cerebral palsy
  - chronic diseases of childhood; especially cystic fibrosis, muscular dystrophy
  - congenital syndromes; especially Down's, Pierre-Robin, mucopolysaccharidoses
  - the child at risk
  - malignancy and the treatment of malignancy
  - renal failure

## **Clinical Management**

Trainees are expected to understand relevant principles, apply knowledge in practice and to demonstrate abilities in paediatric anaesthesia care. These include the following.

- Applying principles of paediatric anaesthesia for the following surgical sub-specialties:
  - Neurosurgery
  - Ophthalmology
  - Dental surgery
  - Plastics and reconstructive surgery
  - Thoraco-abdominal surgery including laparoscopic/ thoracoscopic techniques
  - Cardiac surgery and procedures
  - Urology surgery and procedures/investigations
  - Orthopaedic Surgery
  - Otolaryngology
  - General surgery
  - Trauma and Burns
- Applying principles of paediatric anaesthesia for diagnostic procedures
- Recognising and managing the sick child
- Recognising and managing reversal to transitional foetal circulation
- Managing fluid therapy in paediatric patients
- Post-operative anaesthetic complications e.g. laryngospasm, emergence delirium
- Managing specific childhood syndromes and disorders
- Applying principles of paediatric anaesthesia for procedures outside the operating theatre, including patient transport
- Caring for paediatric patients undergoing imaging investigations, which may require sedation or anaesthesia
- Recognising and managing paediatric emergencies including basic and advanced life support
- Understanding the organisation of a paediatric anaesthesia and analgesic service
- Recognising psychological issues relevant to hospitalised children

## **Skills**

### ***Clinical Skills***

In this Module, Trainees will provide safe anaesthesia for paediatric patients and the support of the critically ill child.

Trainees will revise pre-assessment skills, including taking an appropriate history and performing an appropriate physical examination (including airway assessment, cardiovascular, respiratory and neurological examinations) to assess the patient's status.

Trainees will demonstrate decision-making and clinical skills, and perform drills such as paediatric advanced life support, to manage emergencies and conditions including the following.

- Hypoxia
  - Bronchospasm
  - Apnoea
  - Upper airway obstruction including upper airway infection
  - Bradycardia (and other arrhythmias)
  - Cardiac arrest
  - Hypovolaemia
  - Neurological compromise
  - Epiglottitis and croup
  - Inhaled foreign body
  - Infantile airway obstruction
  - Laryngospasm
  - Masseter spasm
  - Postoperative stridor
  - Aspiration of gastric contents
- Skills learned in Modules 1 and 2 should be reviewed
  - Technical skills, such as airway management, vascular cannulation and regional anaesthesia should be demonstrated for paediatric patients
  - Interpersonal skills in dealing with paediatric patients and their carers should be demonstrated

## **Attitudes and behaviours**

***Paediatric Considerations***

The following attitudinal considerations are important in caring for children:

- Varied individual needs of hospitalised children
- Communication with children and their carers
- Interaction with children that is appropriate to their developmental age
- Psychosocial aspects, especially the stress of separation experienced by children and their carers alike
- Strategies to provide informed consent and disclosure of risk when consulting with children and carers
- Planning of post-operative management, particularly of pain, stress and post-operative nausea and vomiting
- Follow-up after anaesthesia complications

**Module 10 – Intensive care**

**Duration required: 3 months.** A minimum of three months in an approved ICU is required as a single period or in periods of not less than one month.

### **Trainee's Aims**

In this Module, clinical experience is gained in the Intensive Care Unit (ICU). Trainees will acquire knowledge of medical and surgical conditions and practical skills. Trainees will assess and define clinical problems in the critically ill, and develop and facilitate diagnostic and management plans.

The **aim of Module 9** is for Trainees to learn a series of clinical abilities and skills in managing critically ill patients. The level of expertise to acquire is that required for a specialist anaesthetist to manage ICU patients for surgical procedures or to support the specialist intensivist in an ICU. This includes understanding general principles of conditions that are normally managed by specialist intensivists. An understanding of medical disorders in this Module is also required knowledge for the practice of a specialist anaesthetist.

Trainees need to achieve these aims:

- Develop rapid and appropriate responses to life-threatening problems, including priorities of management
- Acquire and apply knowledge in all clinical disciplines relevant to critically ill patients

### **Knowledge**

#### ***Supportive Care of the Critically Ill Patient***

Trainees are expected to understand the following:

- ***Organisation of Intensive Care Services and Standards of ICUs***
- ***Transport of the Critically ill Patient***
- ***Sedation and Analgesia***
- ***Principles of Antibiotic Use***
  - Mechanisms of action, indications, adverse effects, resistance
  - Effects of hepatic, biliary and renal failure
- ***Inotropic Support***
  - Effects of critical illness and concomitant therapies on receptor function
  - Effects of inotropic and vasopressor agents
- ***Nutrition, Fluid and Electrolyte Support***
  - Principles of fluid management
  - Appropriate use of blood and blood products
  - Metabolic response to critical illness and starvation
  - Adverse consequences of malnutrition, dehydration and fluid overload
  - Principles of enteral and intravenous nutrition
  - Glycaemic control in the critically ill
- ***Prevention of complications including:***
  - Nosocomial infection
  - Ventilator-induced lung injury
  - Thromboembolic disease
  - Stress ulceration

#### ***Specific Disorders***

To practise as a specialist anaesthetist, trainees are expected to understand the following:

- ***Acute Circulatory Failure***
  - Classification, causes, pathogenesis and sequelae of shock
  - Principles of management of all forms of shock
  - Monitoring in the management of shock
  - Causes of cardiorespiratory arrest and the effects on body systems
  - Cardiopulmonary resuscitation and external defibrillators
  - Cardiac dysrhythmias and their current therapies
  - Hypertension
  - Valvular heart disease
  - Endocarditis, myocarditis and pericarditis
  - Pulmonary embolism
  - Congestive cardiac failure

- Anaphylaxis
- **Ischaemic Heart Disease and Myocardial Infarction**
  - Factors involved in the balance of oxygen supply and demand to the heart
  - Aetiology of coronary artery disease and its effects
  - Signs and symptoms of ischaemic heart disease
  - Signs and symptoms of myocardial infarction
  - Principles of the management of acute myocardial infarction including thrombolysis, angioplasty and surgery
  - Indications for a transvenous pacemaker, right heart catheterisation, angiography and echocardiography and interpretation of the results
  - Immediate, perioperative and long-term effects of acute myocardial infarction; late complications
  - Medical management of NSTEMI
- **Respiratory disease processes and respiratory failure:**
  - Causes and pathogenesis of respiratory failure
  - Appropriate use and interpretation of pulmonary function tests
  - Oxygen therapy and mechanical ventilatory support (invasive and non- invasive)
  - Cardiogenic / non-cardiogenic pulmonary oedema/ARDS
  - Airway obstruction
  - Airway stenosis and tracheomalacia
  - Bronchopleural fistula
  - Pneumothorax
  - Aspiration syndromes
  - Fat embolism
  - Pneumonia (community-acquired and nosocomial)
  - Chronic airway limitation
  - Asthma
- **Renal Failure**
  - Definitions of acute and chronic renal failure
  - Causes and pathogenesis of renal failure particularly in the perioperative setting
  - Acute renal failure, including contrast-induced nephropathy
  - Consequences to drug pharmacokinetics
  - Principles of renal replacement therapy and its indications
- **Neurological Failure**
  - Definition and causes of coma
  - Causes, pathogenesis and treatment of cerebral oedema and raised intracranial pressure
  - Principles of cerebral function and intracranial pressure monitoring
  - Principles of diagnosing brain stem death
  - Representative conditions to be understood:
    - Acute vascular disorders of the central nervous system
    - Acute infective disorders of the central nervous system
    - Cerebral oedema
    - Brain stem death
    - Seizures
    - Hemiplegia, paraplegia,
    - Quadriplegia
    - Guillain Barre syndrome
    - Peripheral nerve and or muscle dysfunction associated with critical illness
    - Myasthenia gravis
    - Parkinson's disease
    - Hyperthermia, hypothermia
    - Tetanus
    - Rabies
    - Delirium, clinical and metabolic psychoses
- **Severe Trauma**
  - Effects of severe trauma on organs and organ systems
  - Principles of EMST for the management of trauma and advantages of an organised team approach
  - Principles of the safe transfer of injured children and adults and portable monitoring systems
  - Maxillofacial and airway injuries
    - Technique of cricothyroidotomy/ tracheostomy/mini-tracheotomy
  - Neurotrauma / acute spinal cord injury



- Principles of the management of head injury and Glasgow Coma Scale
  - Management of cervical spine injuries
  - Spinal shock
- Chest injuries and pneumothorax
- Abdominal trauma
- Vascular trauma
  - Aortic injuries
- Pelvic injuries
- Long bone trauma
- **Sepsis**
  - Definition, pathogenesis and pathophysiology of sepsis and related syndromes
  - Risk factors for nosocomial infection
  - Infection control measures in ICU and operating suites
- **Other Systems — Representative conditions:**
  - Endocrine Disorders
    - Diabetes mellitus, pituitary and hypothalamic disorders, Addison's disease, Cushing's syndrome, complications of steroid therapy, pheochromocytoma, Conn's syndrome, thyroid disorders, carcinoid.
    - Endocrine crises
  - Metabolic Disorders
    - Metabolic response to stress, sepsis, starvation, surgery and trauma
    - Electrolyte and acid-base disorders
    - Lactic acidosis
    - Nutrition and malnutrition
  - Haematology, Oncology, Immunology, Rheumatology
    - Defects in haemostasis e.g. DIC, thrombocytopenia, hypercoagulation syndromes
    - Anaemia
    - Transfusion reactions
    - Anaphylactic and anaphylactoid reactions
    - Immunosuppression
  - Gastrointestinal Disorders
    - Gastrointestinal bleeding (acute gastric erosions, peptic ulceration, oesophageal varices)
    - Paralytic ileus, gastric dilatation
    - Pseudo-membranous colitis
    - Peritonitis and intraabdominal sepsis
    - Postoperative GIT problems
    - Malabsorption
    - Pancreatitis
    - Hepatic failure
  - Infectious Disorders
    - Infections; bacterial, viral (including HIV/AIDS), fungal, rickettsial and protozoal
    - Serious community acquired infections, e.g., meningococcal disease
    - Nosocomial infections, particularly multiple antibiotic resistance e.g., MRSA
    - Sepsis, severe sepsis, septic shock and septicaemia
  - Pregnancy and Gynaecological Disorders
    - Mechanical and physiological consequences of pregnancy
    - Septic abortion
    - Eclampsia, pre-eclampsia
    - Amniotic fluid embolism
    - Obstetric haemorrhage
    - Molar pregnancy
  - Toxic, Chemical, Physical Agents
    - Drug overdose and poisoning, including herbal remedies
    - Drug addiction and withdrawal syndromes
    - Ingestion of corrosive
    - Burns
    - Envenomation
    - Electrocutation
    - Decompression syndromes
    - Altitude sickness

- Hyperthermia
- Hypothermia
- Near-drowning

## **Clinical Management**

Trainees are expected to apply knowledge in practice, to understand relevant principles, and to demonstrate abilities in the ICU. These include the following:

### **Professional Practice**

- Comply with the relevant policies, recommendations, and guidelines in professional practice

### **Immediate Patient Assessment and Resuscitation**

- Assess life-threatening problems accurately and quickly in a critically ill patient
- Judge whom to resuscitate (and whom not to)
- Judge the priorities of immediate resuscitation
- Undertake emergency management including basic and advanced life support
- Provide immediate life-supporting therapy
- Perform primary and secondary surveys

### **Communication**

- Document patient information clearly, presenting problems and progress
- Generate a list of differential diagnoses and priorities in investigations
- Confirm or refute some early diagnoses in emergency situations before data collection is complete in order to start treatment
- Counsel patients and relatives
- Consult and collaborate effectively
- Conduct appropriate handover to other colleagues, e.g., before or after surgery or on discharge to the ward

### **Supportive Care of Critically Ill Patients**

- **Inotropic Therapy**
  - Recognise when to use inotropic or vasopressor therapy
  - Use of appropriate agent, dose, clinical endpoint, and route of administration
  - Review the efficacy of inotropic therapy at regular intervals
- **Nutritional Support**
  - Provide appropriate nutritional support
- **General Care**
  - Institute an appropriate plan for care of bowels, skin, mouth, eyes and maintenance of mobility and muscle strength

### **Monitoring of the Critically Ill Patient**

- Principles of monitoring, systems available, complications
- Monitoring of the cardiovascular, respiratory, renal and central nervous systems
- Complications of monitoring
- Electrical safety

### **Specific Disorders**

- **Acute Circulatory Failure**
  - Recognise and assess severity of shock and manage the condition
  - Manage cardiorespiratory arrest using accepted international protocols
  - Recognition and management of arrhythmias
- **Ischaemic Heart Disease and Myocardial Infarction**
  - Recognise the signs and symptoms of ischaemic heart disease
  - Recognise the complications of myocardial infarction and the need for medical and surgical intervention
- **Respiratory Failure**
  - Recognise and manage respiratory failure
  - Distinguish acute from chronic respiratory failure and the implications for management
  - Management of tracheostomy

- **Haemorrhage**
  - Control bleeding
  - Use blood components appropriately
  - Manage coagulopathies
- **Renal Failure**
  - Identify patients at risk of developing renal failure
  - Apply general principles in the management of a patient with renal failure
- **Neurological Failure**
  - Recognise coma and assess its severity
  - Manage an unconscious patient
- **Severe Trauma**
  - Use a systematic, priority-orientated approach in resuscitation, assessment, investigation and emergency management
  - Recognise differences of management of injury between a child and an adult
  - Effectively transfer injured adults and children within and between hospitals
  - Continue management including preventing, recognising and managing complications
- **Sepsis**
  - Apply the definitions of sepsis to diagnosis
  - Resuscitate a patient with septic shock, using appropriate monitoring, fluid therapy and vasoactive agents
  - Collect appropriate specimens for laboratory examination
  - Recognise the need for surgical intervention and consult appropriately

## Skills

In this Module, Trainees will provide care for ICU patients. Specific clinical and technical skills in which Trainees are required to be competent include the following.

### **Cardiovascular**

- Choosing and using inotropic agents, vasodilators, and vasoconstrictors
- Managing dysrhythmias
- Choosing and using antimicrobial agents in heart disease
- Assisting with intra-aortic balloon pumping
- Cardioversion
- Advanced life support
- Right heart catheterisation

### **Respiratory**

- Oxygen therapy and humidification
- CPAP
- Non-invasive ventilation
- Mechanical ventilation, including modes of ventilation and their graphical display
- Weaning and extubation
- Pleural drainage
- Percutaneous tracheostomy
- Fiberoptic bronchoscopy

### **Renal Failure**

- General care of continuous dialysis and haemofiltration techniques

### **Neurological Failure**

- Maintaining cerebral perfusion pressures and intracranial pressures
- Use and interpretation of monitors of neurological function and cerebral perfusion

### **Gastro-intestinal**

- Assisting with placing a Sengstaken-Blakemore or other balloon tamponade tube

### **ICU Considerations**

In particular, considerations in attitudes in Intensive Care include:

- Provision of support and good communication to grieving relatives
- Influence of race, culture, gender and socio-economic status on the practice of intensive care
- Medical ethics and personal ethical considerations, especially in end-of-life decisions. Organ harvesting, and conflicting resource needs of patient, society, and the health care profession
- Professionalism in the ICU
- Awareness of personal and medical limitations
- Importance and value of teamwork

### Trainee's Aims

This Module builds on clinical experience in pain management learned during Basic Training.

The **aim of Module 10** is for Trainees to acquire clinical abilities and skills in managing peri-operative post-traumatic, acute medical and persistent pain as an anaesthetist (but not to the level of a pain specialist). This includes learning to integrate and apply knowledge and skills in clinical management, such as in:

- Assessing pain
- Taking a “pain history” and examination
- Providing perioperative and other acute pain relief
- Identifying and managing patients with persistent pain, including referral when appropriate, to pain medicine specialists
- Working in an interdisciplinary management paradigm

### Knowledge

#### **Basic Sciences**

Trainees are required to revise the relevant subjects in the Basic Sciences. Trainees are expected to apply Basic Science principles in clinical practice.

Basic science subjects relevant to this Module include the following:

- **Neurobiology of Pain**
  - Overview of “Pain Pathways”
  - Multi-dimensional aspects of pain; role of physiological, psychological and environmental factors
- **Pharmacology of Analgesic Agents** including pharmacokinetic and pharmacodynamic principles, drug interactions, and side effects.
  - Knowledge of the pharmacology of:
    - Opioids
    - Paracetamol
    - Non-steroidal anti-inflammatory agents (NSAIDs)
    - Antidepressants (TCAs and SSRIs)
    - Anticonvulsants
    - Membrane-stabilising agents
    - Alpha-2 agonists
    - NMDA-receptor antagonists
    - Local anaesthetics
    - Anti-emetics
    - Agents used to treat hypotension associated with neuraxial blockade
  - Awareness of the role of the following in pain management
    - Anti-migraine agents
    - Steroidal anti-inflammatory agents
    - Topical agents (NSAIDs, Capsaicin)
    - Neurolytic agents
    - Experimental agents for analgesia
  - Knowledge of different routes of analgesic drug delivery, advantages and disadvantages of each, and their side effects
    - Oral
    - Intramuscular
    - Subcutaneous (including continuous infusion)
    - Intravenous (including continuous infusion)
    - Patient-controlled analgesia (PCA) via different routes (i.e. intravenous, subcutaneous, intranasal, epidural, intrathecal)
    - Neuraxial
    - Other; topical, transdermal, rectal, transmucosal (intranasal, inhalational and sublingual / buccal), intra-cerebroventricular,
    - intra-articular, incisional

#### **Principles of Pain Medicine**

- **History, Philosophy and Medicolegal Aspects**
  - Concepts of pain and suffering
  - Relevance of the subjective nature of pain report to pain assessment
  - Relevant ethical principles including professional responsibility (professional power, vulnerable groups), autonomy and dignity, national and regional legislative and ethical issues regarding death, particularly with respect to euthanasia
  - National and regional issues relevant to the prescription of controlled substances including the Poisons Act and Regulations
  - Informed consent with focus on issues relevant to the patient with pain
  - Confidentiality principles, including relevant national and regional legislation
  - Principles of evidence-based medicine as they apply to the assessment of pain interventions
  - Epidemiological aspects of persistent pain, including social cost
- **Psychological and Socio-cultural Issues** in the presentation and management of pain with emphasis on:
  - Factors involved in the wide variation in individual response to tissue injury
  - The relationship between depression and persistent pain
  - The role of anxiety and/or depression in acute pain
  - Differentiation of active and passive coping strategies
  - The role of illness behaviour
  - The role of national and regional compensation and other third party issues in the presentation of pain and response to treatment
  - The influence of the health care provider on the response to pain treatment
  - The importance of an interdisciplinary approach to pain assessment and treatment (including psychiatrist, clinical psychologist, physiotherapist, nursing staff, occupational therapist, social worker)
  - The placebo effect and its implications for treatment of pain
- **Substance Abuse**
  - Concepts of tolerance, physical dependence, addiction and pseudoaddiction
  - Iatrogenicity in tolerance and dependence
  - Common licit and illicit drugs of abuse
  - Therapeutic use of “recreational” drugs, e.g. cannabis
  - The importance of a multidisciplinary approach to pain management in patients with a history of substance abuse (including monitoring, drug therapy, rehabilitation)
  - Principles of detection, initial intervention and ongoing treatment of substance abuse in doctors (including awareness of services available for treatment of the impaired doctor)

## Clinical Management

### **Professional Practice**

- Comply with relevant policies, recommendations, and guidelines for practice.
- Understand the organisation of a Multidisciplinary Pain Clinic and an Acute Pain Service, including the role of such services in education (of patients and staff), collaboration, documentation and administration, and the role of protocols and audit

### **Pain Assessment and Measurement**

- Assess pain and outcome of pain treatment using history, clinical examination and pain measurement tools
- Recognise the limitations of pain measurement techniques, particularly in some patient groups (e.g., persistent pain, children, those with cognitive impairment)

### **Acute Pain**

- **General Principles**
  - Neuroendocrine and metabolic responses to surgery and other acute stressors and impact of analgesic techniques
  - Consequences of poorly controlled pain
  - Current evidence for and against pre-emptive analgesia and clinical implications
  - Current evidence for the effect of analgesic technique on morbidity and mortality
  - Importance of aggressive multimodal postoperative rehabilitation
  - Relationship between acute and persistent pain including factors involved in progression from one to the other, and potential interventions to prevent such progression
- **Choice of the most appropriate technique of acute pain management:**
  - Pharmacological techniques (opioid and non-opioid) via a variety of routes

- Regional techniques including central neuraxial, plexus and peripheral nerve blockade
- Non-pharmacological techniques
- *Formulation of a pain management plan, based on:*
  - Patient preference, physical and mental status, and available expertise and technology
  - Special requirements in specific patient groups (e.g., the elderly, children, pregnant and postpartum patients; obstructive sleep apnoea, concurrent hepatic or renal disease; non-English speaking, cognitive impairment)
  - Special requirements in patients with opioid-tolerance and/or a substance abuse disorder including an understanding of guidelines and regimens for analgesic drug use (equi-analgesic dosing for opioids; tolerance and dependence)
  - Special requirements under specific clinical situations (e.g., spinal injuries, burns, acute back pain, musculoskeletal pain, acute medical pain, acute cancer pain and patients in Intensive Care and the Emergency Department)
  - Including:
    - Appropriate evaluation of the patient's pain
    - Informed consent, including disclosure of risk and appropriate documentation
    - Patient education about the selected technique and alternatives
- *Recognition of common presentations of acute musculoskeletal pain* (e.g., rib fracture, acute back pain) and other non-surgical acute pain syndromes (migraine, renal colic) including in the Emergency Department and Intensive Care Unit
- Identify when to seek advice from, or refer to, a Pain Medicine Specialist

#### **Cancer Pain**

- Undertake assessment of pain in patients with cancer based upon:
  - Understanding of the multiple potential aetiologies of pain associated with cancer
  - Differentiation between somatic, visceral, and neuropathic pain
  - Evaluation of psychological, social, cultural and spiritual issues
- Undertake treatment of cancer-related pain syndromes based on therapies available (including chemotherapy, radiotherapy, surgery, invasive and non-invasive analgesic techniques, and psychological approaches)
- Understand guidelines and regimens for analgesic drug use including equianalgesic dosing for opioids; tolerance and dependence and their management in the patient with cancer
- Identify when to seek advice from, or refer to, a Pain Medicine Specialist

#### **Neuropathic Pain**

- Understand diagnostic criteria, clinical features and management of specific neuropathic pain syndromes including:
  - Central pain (pain after stroke, thalamic pain, spinal cord injury pain, deafferentation pain, phantom limb pain)
  - Neuralgias (trigeminal neuralgia, postherpetic neuralgia, occipital neuralgia)
  - Painful peripheral neuropathy (e.g., metabolic, toxic, ischaemic)
  - Pain after nerve injury (e.g., neuroma)
  - Post-surgical pain syndromes (e.g., post-thoracotomy, post-CABG pain, post-mastectomy, post-amputation)
  - Complex regional pain syndrome types 1 and 2 (including the differentiation of sympathetically-maintained from sympathetically-independent pain)
- Identify when to seek advice from, or refer to, a Pain Medicine Specialist

#### **Pain in Children**

- Recognise and understand the ways in which acute and persistent pain in children differ from pain in adults, including:
  - The effect of developmental stage on assessment and management of pain in children
  - The selection of pain assessment tools for children of different developmental stages
  - Principles of managing acute, procedural and persistent pain in children

#### **Pain in the Elderly**

- Understand pain management in the elderly, taking into account:
  - The epidemiology of pain syndromes in the elderly
  - Physiological changes associated with ageing and effects of these on pain and pain management (including changes in pharmacokinetics, pharmacodynamics, and pain biology)

- Effects of concurrent disease, and psychological, social and cognitive changes on assessment and management of pain
- Risks associated with polypharmacy in the elderly

## **Skills**

### ***Clinical***

In this Module, Trainees will provide, or assist with, appropriate pain management in both inpatient and outpatient settings.

### ***Clinical Evaluation***

Trainees will demonstrate skills in the clinical evaluation of patients with acute and persistent pain by:

- Obtaining a specific pain history
  - Onset, location, nature, duration, intensity, aggravating and relieving factors
  - Physical, psychological and social consequences of the patient's pain
  - Current and past pain treatments and outcome
  - Other relevant history (past patterns – of drug use or misuse, family history, medical and surgical history)
  - Pain beliefs
  - Treatment expectations
- Interpreting relevant investigations
- Formulating a management plan and evaluating outcome

### ***Technical***

Trainees need to understand the anatomy, technique, indications, contraindications, complications and management of and obtain competency in:

- Central neuraxial blocks
- Regional techniques (including knowledge of anatomy, technique, indications, contraindications, complications and their management) including:
  - Peripheral and plexus blocks of the upper and lower limb
  - Head and neck blocks
  - Truncal blocks including intercostal and paravertebral block

Trainees need a similar understanding of (but not necessarily be able to perform):

- Stellate ganglion blockade
- Coeliac plexus blockade
- Lumbar sympathetic blockade
- Intrathecal drug delivery for cancer and persistent pain

### ***Communication***

- Demonstrate communication skills in dealing with patients in pain, including:
  - Dealing with issues of grief and loss
  - Undertaking conflict management (e.g., in dealing with angry patients, in dealing with other staff)
  - Appropriate use of (non-medical) language in communicating with patients and their families, including with specific patient groups such as children
- Demonstrate communication skills with other health professionals by
  - Presenting results of patient assessment at multidisciplinary meetings where appropriate
  - Undertaking consultation (verbal and/or written) with other medical and paramedical specialists, as indicated by the clinical situation