MODULE 9
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 establishing priorities of management
- Acquire and apply knowledge in those aspects of medicine, surgery, paediatrics, obstetrics and anaesthesia that are relevant to critically ill patients

Learning Objectives

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

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

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

Inotropic Therapy

- Effects of critical illness and concomitant therapies on receptor function
- Effects of inotropic and vasopressor agents
Nutrition, Fluid and Electrolyte Support

- Metabolic response to critical illness and starvation
- Adverse consequences of malnutrition, dehydration and fluid overload

- Principles of enteral and intravenous nutrition

General Care

- Prevention of complications including:
  - Nosocomial infection
  - Ventilator-induced lung injury

- Thromboembolic disease
- Stress ulceration

Knowledge — 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
- Valvular heart disease
- Endocarditis
- 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
- Long-term effects of acute myocardial infarction and late complications

Respiratory Failure

- Causes and pathogenesis of respiratory failure
- Oxygen therapy and mechanical ventilatory support (invasive and non-invasive)
- Respiratory disease processes, representative conditions to be understood:
  - Cardiogenic/non-cardiogenic pulmonary oedema/ARDS
  - Airway obstruction

- Airway stenosis and tracheomalacia
- Bronchopleural fistula
- Pneumothorax
- Aspiration syndromes
- Fat embolism
- Pneumonia (community and nosocomial)
- Chronic airway limitation
- Asthma
Renal Failure
- Definitions of acute and chronic renal failure
- Causes and pathogenesis of renal failure
- Acute renal failure
- Principles of renal replacement therapy and their indications

Neurological Failure
- Definition and causes of coma
- Causes, pathogenesis and treatment of cerebral swelling and raised intracranial pressure
- Principles of cerebral function monitoring, especially intracranial pressure
- 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
  - Hyperthermia, hypothermia
  - Tetanus
  - Delirium

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
- Technique of cricothyroidotomy/tracheostomy/mini-tracheotomy
- Principles of the management of head injury and Glasgow Coma Scale
- Management of cervical spine injuries
- Principles of the safe transfer of injured children and adults and portable monitoring systems
- Risk factors for nosocomial infection
- Infection control measures in ICU and operating suites

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 and diabetes insipidus
- Pituitary and hypothalamic disorders
- Addison's disease
- Cushing's syndrome, complications of steroid therapy
- Conn's syndrome
- Thyroid disorders
- Phaeochromocytoma

Metabolic Disorders
- Metabolic response to stress, sepsis, starvation, surgery and trauma
- Electrolyte and acid-base disorders
- Nutrition and malnutrition

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Haematology, Oncology, Immunology, Rheumatology

- Defects in haemostasis eg DIC, thrombocytopenia, hypercoagulation syndromes
- Anaemia

Gastrointestinal Disorders

- Gastrointestinal bleeding (acute gastric erosions, peptic ulceration, oesophageal varices)
- Paralytic ileus, gastric dilatation
- Pseudo-membranous colitis

Infectious Disorders

- Infections; bacterial, viral, fungal, rickettsial and protozoal
- Serious community acquired infections, eg, meningococcal disease

Complications of Pregnancy and Gynaecological Disorders

- Septic abortion
- Eclampsia, pre-eclampsia

Trauma

- Maxillofacial and airway injuries
- Chest injuries and pneumothorax
- Aortic injuries
- Abdominal trauma

Toxic, Chemical, Physical Agents

- Drug overdose and poisoning
- Ingestion of corrosive
- Burns
- Envenomation
- Electrocuton

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 as contained in ANZCA and JFICM professional documents (see Appendix)

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

Supportive Care of Critically Ill Patients

Inotropic Therapy

- Recognise when to use inotropic or vasopressor therapy
- Choose an appropriate agent, dose, physiological endpoint, rate and route of administration

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
- 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

Ischaemic Heart Disease and Myocardial Infarction

- Recognise the signs and symptoms of ischaemic heart disease

Respiratory Failure

- Recognise and manage respiratory failure
- Distinguish acute from chronic respiratory failure and the implications for management

Counsel patients and relatives

Consult and collaborate effectively

Conduct appropriate handover to other colleagues, eg, before or after surgery or on discharge to the ward

Review the efficacy of inotropic therapy at regular intervals

Manage cardiorespiratory arrest using the Australian Resuscitation Council’s and other accepted international protocols

Recognise the complications of myocardial infarction and the need for medical and surgical intervention

Management of tracheostomy
Haemorrhage
- Control bleeding
- Use blood components appropriately

Renal Failure
- Identify patients at risk of developing renal failure
- Manage coagulopathies
- 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 between management of the injured child from that of the 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 — Clinical 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 Related
- 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 Related
- Oxygen therapy
- CPAP
- Non-invasive ventilation
- Mechanical ventilation, including modes of ventilation
- Pleural drainage
- Percutaneous tracheostomy
- Fibreoptic bronchoscopy

Renal Failure
- General care of continuous dialysis and haemofiltration techniques

Neurological Failure
- Maintaining cerebral perfusion pressures and intracranial pressures
Gastro-intestinal

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

**Skills — Educational Skills**

Trainees are expected to build on the educational skills in Modules 1 to 3 and develop the following:

- A review of their personal learning plan as specified in their Learning Portfolio
- Identification of the factors which 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

The Trainee should acquire the following core skills.

**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 E-mail
- 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 2, 11 and 12

**During Advanced Training**

- 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
- Comprehending how decisions are made
- Determining what information should be accepted or rejected in decision-making
- Determining the value of information from various sources and the importance of cross-validation
- Assessing professional performance
- Conducting and appraising literature searches
- Appraising journal articles including the application of statistics
- Applying the principles of evidence-based medicine to clinical practice
- Carrying out oral presentations and professional communication. Specific skills in communication are outlined in Modules 2, 11 and 12
- Presenting quality assurance exercises or projects
- Developing facilitation skills, such as tutoring in small-group learning and conducting small-group meetings
Attitudes and Behaviours

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

Core attitudes and behaviours that Trainees must cultivate during the whole period of FANZCA training include the following.

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 medico-legal 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
Curriculum Modules

Module 9 – Intensive Care

- 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

**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

**Assessment**

The Module 9 Supervisor will validate the Trainee’s completion of the module in accordance with the process outlined in College Professional Document TE2. This will involve the Trainee assessing whether she/he has achieved the core aims (Trainee’s aims) of the module and fulfilled the minimum clinical experience. The Module 9 Supervisor will review the Trainee’s Learning Portfolio as part of this assessment.

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.

The Primary and Final Examinations will be summative assessments of the Trainee. Aspects of physiology, pharmacology, anatomy, clinical measurement, and monitoring in Intensive Care will be assessed in the Primary Examination. Clinical management and clinical skills in this Module 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 from the Learning Portfolio. For example, the Learning Portfolio should show the Trainee’s progress through the Module, as records of clinical experience (sessions), technical skills learned, topics reviewed and oral presentations delivered.