

**T- 5**  
(2010)



**College of Intensive Care Medicine  
of Australia and New Zealand**  
ABN: 16 134 292 103

# **OBJECTIVES of BASIC TRAINING and COMPETENCIES**

**Promulgated by JFICM:  
Republished by CICM: 2010**

## **Introduction**

This document defines the knowledge, skills and attitudes that you as an intensive care specialist in training should acquire during the Basic Training period, and should maintain and enhance throughout professional life. It is a statement of the minimal level of competency expected of you at the end of Basic Training. It therefore includes many of the issues and topics that will be examined in the Basic Sciences Examination in Intensive Care and is, to some extent, a supplement to the exam syllabus.

Within each competency it is understood that you as the trainee should:

- a. accumulate knowledge
- b. learn how to apply the knowledge
- c. show how an action is performed, in the light of the applied knowledge
- d. undertake the action

At the end of Basic Training it is expected that you will have acquired those skills and attributes which will equip you for functioning as an Advanced Trainee so that effective use is made of that time. Training is a staged process and forms a continuum with your future career as a specialist so that you become a life-long learner.

This document should be read in conjunction with:

- a) The “Curriculum for General Intensive care Training”
  - summarises all the requirements and components of the program
- b) The “Syllabus for the Basic Sciences in Intensive Care”
  - lists the components of the CICM Primary Examination

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## **(1) THE BASIC SCIENCES**

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This section should be read in conjunction with “The CICM SYLLABUS For the Basic Sciences in Intensive Care”

### **1.1 Introduction**

As a trainee you should develop a broad understanding of Physiology, Pharmacology, Anatomy, Evidence Based Medicine and Clinical Measurement as is applicable to intensive care practice. These sciences provide a sound basis for learning and clinical practice in future years.

### **1.2 Evidence Based Medicine**

#### *General Instructional Objective*

You should understand the scientific method and its application in research and demonstrate the ability to critically evaluate published research

#### *Required Abilities and Qualities*

- a. Describe EBM, assessment of original research, systematic review and meta-analysis
- b. Describe the stages in the design and performance of a clinical trial
- c. Describe commonly used statistical principles
- d. Describe error and bias and understand their effect on clinical trials
- e. Understand the ability of a test to predict the presence or absence of a disease
- f. Understand risk estimation and tests of significance

### **1.3 General Pharmacology**

#### *General Instructional Objective*

You should understand the principles of General Pharmacology as they are applicable to the safe practice of intensive care medicine

#### *Required Abilities and Qualities*

- a. Understand in general how drugs are made and presented (pharmaceutics)
- b. Understand in general how the body handles drugs in normal and disease states (pharmacokinetics)
- c. Understand in general how drugs affect the patient (pharmacodynamics) in therapeutic doses and overdose

## 1.4 **Anatomy, Physiology and System Based Pharmacology**

### *General Instructional Objective*

You should understand the principles of Physiology, Anatomy and Pharmacology applied to each body system as they are applicable to intensive care medicine.

### *Required Abilities and Qualities*

- a. Understand basic Cellular Physiology
- b. Understand Respiratory Physiology and its related Anatomy and Pharmacology
- c. Understand Cardiovascular Physiology and its related Anatomy and Pharmacology
- d. Understand Renal Physiology and its related Anatomy and Pharmacology
- e. Understand the Physiology of the body fluids and electrolytes and related Pharmacology
- f. Understand Nervous System Physiology and its related Anatomy and Pharmacology
- g. Understand Autonomic System Physiology and related Anatomy and Pharmacology
- h. Understand Musculoskeletal Physiology and its related Anatomy and Pharmacology
- i. Understand Hepatic and Gastrointestinal Physiology and their related Anatomy and Pharmacology
- j. Understand Physiology of the Haematological System including Immunology and its related Pharmacology
- k. Understand Metabolism and Nutrition Physiology and Pharmacology
- l. Understand Endocrine Physiology and Thermoregulation and the related pharmacology
- m. Understand Maternal, Foetal and Neonatal Physiology and their related Anatomy and Pharmacology

## 1.5 **Principles of Measurement and Clinical Monitoring**

### *General Instructional Objective*

You should understand the principles of monitoring and clinical measurement relevant to intensive care medicine.

### *Required Abilities and Qualities*

See Section 7

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## **(2) THE APPROACH TO ACUTE ILLNESS**

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### 2.1 **Introduction**

To prepare for Advanced Training as a trainee you require an understanding of how normal physiology may be disrupted by disease, a broad knowledge of medical and surgical conditions and you should be developing practical skills.

You should be aware of the model of the approach of the intensive care doctor to acute illness as shown below.

## 2.2 **Immediate Assessment and Therapy (Resuscitation)**

### *General Instructional Objective*

You should be learning to make a quick and accurate assessment of the life threatening problems in a critically ill patient and help to apply life-supporting therapy.

### *Required Abilities and Qualities*

- a. Judge the priorities of immediate resuscitation
- b. Undertake emergency management including basic and advanced life support
- c. Obtain relevant information rapidly and accurately and perform a brief, pertinent examination enabling immediate and effective resuscitation to be achieved including the management of rapidly reversible problems (e.g. tension pneumothorax)
- d. Instigate emergency investigations during the course of resuscitation to exclude other rapidly reversible problems (e.g. hyperkalaemia)
- e. Obtain an accurate history (if this was not possible previously) and perform a clinical examination as soon as possible to detect the primary disease process
- f. Monitor physiological functions whilst further assessment is undertaken
- g. Recognise and respond rapidly to adverse trends in monitored parameters

## 2.3 **Formal Medical Assessment, Problem Solving and Decision Making**

### *General Instructional Objective*

Following resuscitation, you should effectively contribute to the continuing management of the acutely ill patient.

### *Required Abilities and Qualities*

#### 2.3.1 **Assessment**

- a. Obtain relevant information from the patient, relatives and other informed sources
- b. Take and record an accurate and thorough medical history (with relevant family, past, social, and occupational history)
- c. Perform a thorough physical examination
- d. Assist in the diagnosis of a system failure, a disease, a pathological process, a clinical syndrome or a complication of therapy
- e. Order appropriate investigations and interpret the results correctly to assist diagnosis, monitoring and assessment of therapy

### 2.3.2 Problem Definition

- a. Document patient information either in a chronological or system or problem oriented format, allowing a clear presentation of the problems and progress
- b. Generate an appropriate list of differential diagnoses and prioritise investigations

### 2.3.3 Decision Making

Evaluate initial patient information and management options and formulate and suggest a course of action

### 2.3.4 Planning

Suggest a diagnostic and therapeutic plan that incorporates the selected courses of action and take note of potential interactions of elements of the plan

### 2.3.5 Progress

Understand the requirement to assess the patient's progress often and to modify diagnosis and therapy when necessary

## 2.4 Consultation and Collaboration

### *General Instructional Objective*

You should organise consultations effectively during the management of critically ill patients.

### *Required Abilities and Qualities*

- a. Understand that consultation and collaboration play a vital role in the management of the critically ill patient
- b. Acquire a wide knowledge of disease states to enable recognition of the need to consult
- c. Recognise your limitations in providing optimal patient care
- d. Know how, when and who to ask for assistance

## 2.5 Assessment of Illness and Injury Severity and Outcome Prediction

### *General Instructional Objective*

You should understand that there are clinical and physiological markers used to assess illness and injury severity and the scoring systems developed for assessing the likely outcome from acute illness and assist with data acquisition.

### *Required Abilities and Qualities*

Know that sudden gross changes in certain physiological parameters are life threatening (e.g. mean arterial pressure, pH, PaO<sub>2</sub>, plasma potassium concentration) and assist in the accurate recording of the various scoring systems (e.g. Glasgow Coma Scale, APACHE II and III, PRISM, organ system failure scores, injury severity scores)

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## **(3) SYSTEM(S) FAILURE**

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### **3.1 Introduction**

Patients with organ failure form a major part of the workload of an Intensive Care Unit.

### **3.2 Management of System(s) Failure\**

#### *General Instructional Objective*

You should know how to manage a patient with single or multiple systems failure.

#### *Required Abilities and Qualities*

- a. Recognise a specific organ failure and assess its severity
- b. Understand the underlying causes of system(s) failure and the importance of preventing and treating these quickly and definitively
- c. Understand current concepts of the pathophysiological pathways and mechanisms involved and the evidence for and against interruption of such pathways as a means of treatment

### **3.3 Examples include, but are not restricted to:**

#### **3.3.1 Acute Circulatory Failure**

##### *General Instructional Objective*

You should be able to assist in the management of a patient with a shock syndrome.

##### *Required Abilities and Qualities*

- a. Define and recognise shock and assess its severity
- b. Know the causes of shock and how they are identified and treated
- c. Know the steps involved in reversing shock according to its aetiology and in response to haemodynamic and other physiological data
- d. Know the importance and limitations of non-invasive and invasive monitoring in the management of such patients

#### **3.3.2 Respiratory Failure**

##### *General Instructional Objective*

You should be able to assist in the management of a patient with respiratory failure

##### *Required Abilities and Qualities*

- a. Define and recognise respiratory failure

- b. Know the causes of respiratory failures and how these may be prevented or managed

### 3.3.3 Renal failure

*General Instructional Objective*

You should be able to assist in the management of a patient with renal failure.

*Required Abilities and Qualities*

- a. Define and recognise renal failure

### 3.3.4 Neurological Failure

*General Instructional Objective*

You should be able to assist in the management of an unconscious patient.

*Required Abilities and Qualities*

- a. Understand the factors affecting cerebral blood flow and intracranial pressure
- b. Define and recognise coma and assesses its severity
- c. Know the causes of coma and how they are identified and treated

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## (4) MEDICAL, SURGICAL AND OBSTETRIC CONDITIONS

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### 4.1 Introduction

As a trainee you may be required to assist in the management of patients with a wide range of primary or complicating medical, surgical and obstetric conditions.

*General Instructional Objective*

You should be developing knowledge of medical, surgical and obstetric conditions together with a detailed knowledge of those that may be life-threatening.

*Required Abilities and Qualities*

Assist with the diagnosis and management of those conditions that are recognised to be within the domain of the intensive care specialist

### 4.2 Examples include, but are not restricted to:

#### 4.2.1 Ischaemic Heart Disease and Myocardial Infarction

*General Instructional Objective*

You should know how to manage patients with ischaemic heart disease and acute myocardial infarction.

*Required Abilities and Qualities*

- a. Understand the factors involved in the balance of oxygen supply and demand to the heart
- b. Understand the aetiology of coronary artery disease and its effects
- c. Know and recognise the signs and symptoms of ischaemic heart disease
- d. Know and recognise the signs and symptoms of myocardial infarction, its pathogenesis, the differential diagnosis and diagnostic criteria
- e. Know the acute management of myocardial infarction including thrombolysis, and the indications and contraindications for thrombolysis, angioplasty and surgical intervention

#### 4.2.2 Severe Trauma

*General Instructional Objective*

You should be able to assist in the management of patients who have suffered severe trauma.

*Required Abilities and Qualities*

- a. Understand the effects of severe trauma on organs and organ systems
- b. Appreciate the principles of the EMST system for the management of the critically injured and the advantages of an organised team approach

#### 4.2.3 Sepsis

*General Instructional Objective*

You should be able to assist in the management of a patient with sepsis.

*Required Abilities and Qualities*

- a. Understand the definition of sepsis and related syndromes and apply the definitions to diagnosis
- b. Understand concepts of the pathogenesis of sepsis and related syndromes
- c. Assist in the resuscitation of a patient with septic shock using appropriate monitoring, fluid therapy and vasoactive agents
- d. Take appropriate specimens for laboratory examination

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## (5) THERAPY

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### 5.1 Introduction

As the trainee you should be developing an understanding of therapies commonly undertaken in the Intensive Care Unit, and their complications. These include

pharmacological treatments (e.g. inotropic agents), surgical treatments, mechanical treatments (e.g. mechanical ventilation) and other treatments (e.g. physiotherapy).

*General Instructional Objective*

You should be able to assist with appropriate treatment to correct physiological derangements and to treat specific diseases.

*Required Abilities and Qualities*

Develop an understanding of the range of treatments available for a specific physiological derangement or disease

**5.2 Examples include, but are not restricted to:**

**5.2.1 Fluid Therapy**

*General Instructional Objective*

Prescribe and institute appropriate fluid management for a critically ill patient.

*Required Abilities and Qualities*

- a. Know the causes and pathophysiological effects of altered intravascular volume and state of hydration
- b. Know how to assess the intravascular volume status and state of hydration of a patient using clinical signs and monitoring
- c. Know the components, physical properties, and behaviour of fluids commonly used in therapy
- d. Know the indications, contraindications and complications of various fluid therapies and their administration

**5.2.2 Inotropic/Vasopressor Therapy**

*General Instructional Objective*

You should be able to institute and maintain appropriate inotropic/vasopressor therapy for a critically ill patient.

*Required Abilities and Capabilities*

- a. Know the physiology and anatomical distribution of adrenergic and other relevant receptors
- b. Know the effects of relevant inotropic/vasopressor agents on specific receptor populations.
- c. Be able to recognise the need for inotropic or vasopressor therapy.
- d. Characterise the haemodynamic derangement using clinical examination and invasive haemodynamic monitoring.
- e. Know the potential adverse effects and complications of inotropic/vasopressor therapy in general and of individual medications.
- f. Understand the limitations of inotropic/vasopressor therapy.

### 5.2.3 Respiratory Support

#### *General Instructional Objective*

You should be able to assist in the effective use of respiratory support.

#### *Required Abilities and Capabilities*

- a. Have a sound knowledge of respiratory physiology and understand the effects of pulmonary pathology on physiological parameters
- b. Be able to recognise respiratory failure and know when intervention is necessary
- c. Know how to secure the airway safely and effectively
- d. Know the complications of endotracheal intubation and take steps to minimise these
- e. Understand the principles of oxygen therapy and oxygen delivery systems
- f. Understand the principles of continuous positive airways pressure (CPAP) and positive end-expiratory pressure (PEEP) and CPAP and PEEP delivery systems
- g. Understand the principles of mechanical ventilation and mechanical ventilators

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## **(6) SUPPORTIVE CARE OF THE CRITICALLY ILL PATIENT**

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### **6.1 Introduction**

Longer term support is often required while injured tissues and organs heal and while the physiological consequences of illness and injury are normalised. The concept of total patient care is central to the discipline of intensive care medicine. This includes the support of the function of all organs, measures to prevent complications, and alleviation of pain, anxiety and psychosocial distress. According to need this social support should extend to the immediate family.

### **6.2 Support of the Function of Organs**

#### *General Instructional Objectives*

You should be able to understand that support of all organ systems is vital to the care of critically ill patients irrespective of the organ or system primarily affected by the presenting illness and contribute to the overall supportive management of the acutely ill patient.

#### *Required Abilities and Qualities*

- a. Understand the regulatory processes controlling the function of the particular organ or system

- b. Understand how critical illness may affect these homeostatic mechanisms
- c. Recognise disorders of function of the particular organ or system

### 6.2.1 Examples include, but are not restricted to:

#### 6.2.1.1 Nutritional Support

##### *General Instructional Objective*

You should be able to assist in the provision of appropriate nutritional support for an acutely ill patient.

##### *Required Abilities and Qualities*

Understand normal nutritional requirements, and the metabolic response to critical illness and starvation

#### 6.2.1.2 Metabolic support

##### *General Instructional Objective*

You should be able to assist in maintaining normal fluid, electrolyte and glucose balance in a critically ill patient.

##### *Required Abilities and Qualities*

- a. Understand the normal processes controlling fluid, electrolyte, acid-base and glucose balance
- b. Recognise disorders of fluid, electrolyte, acid-base and glucose balance
- c. Appreciate the pathophysiological consequences of disordered fluid, electrolyte, acid-base and glucose balance

#### 6.2.1.3 General Care

##### *General Instructional Objective*

You should be able to assist with an appropriate plan for care of bowels, skin, mouth, eyes and maintenance of mobility and muscle strength in critically ill patients.

### 6.3 Prevention of Complications

##### *General Instructional Objectives*

You should be able to recognise that complications of intensive care management can contribute to morbidity and mortality.

##### *Required Abilities and Qualities*

- a. Understand the risk of colonisation with potentially pathogenic micro-organisms, and the factors associated with patient, staff, equipment and environmental colonisation
- b. Understand the importance of culturing body fluids and the principles of their collection

## 6.4 Pain management

### *General Instructional Objectives*

You should understand how pain interferes with normal physiology and well-being and assist in the effective management of a wide range of pain syndromes.

### *Required Abilities and Qualities*

- a. Understand the pain pathways and theory of pain generation
- b. Understand the physiological and psychological effects of pain
- c. Understand and assist in the use pain assessment techniques
- d. Understand the pharmacology and roles of enteral and parenteral and regional agents used in the treatment of pain syndromes including:
  - opioids
  - paracetamol, NSAIDs, COX-2 inhibitors
  - NO<sub>2</sub>
  - ketamine
  - antidepressants
  - gabapentin and carbamazepine
  - local anaesthetic agents
- e. Anticipate the development of pain and/or anxiety and assist with strategies for its prevention or minimisation
- f. Know how to recognise and assess the degree of pain and/or anxiety
- g. Understand the effects of analgesic, sedative and hypnotic drugs and their uses and complications

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## (7) MONITORING, MEASUREMENT, INVESTIGATIONS AND INTERPRETATION OF DATA

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### 7.1 Introduction

As an intensive care trainee you require knowledge of monitoring, measurement, investigations and the interpretation of data. This includes an understanding of the indications, limitations and complications of techniques involved and proficiency in the relevant technical skills where these fall within the ambit of the intensive care specialist.

### 7.2 Principles of Measurement

#### *General Instructional Objective*

You should be able to understand the principles of measurement as applied to the critically ill patient and use relevant methods effectively.

#### *Required Abilities and Qualities*

- a. Understand the principles of the system used
- b. Identify deviations from normal range

- c. Understand how trends of change may be significant
- d. Identify changes that are life threatening and respond accordingly
- e. Recognise artefact and/or errors

### 7.3 **Bedside Monitoring**

#### 7.3.1 **Continuous ECG monitoring**

##### *General Instructional Objective*

You should understand the principles of ECG monitoring, its relevance to clinical practice and be able to use it effectively.

##### *Required Abilities and Qualities*

- a. Know that information relating to heart rate, rhythm, conduction, ST segment change and QT interval may be obtained
- b. Know the indications for ECG monitoring
- c. Know the limitations of ECG monitoring
- d. Recognise changes that are potentially life threatening

#### 7.3.2 **Invasive pressure monitoring**

##### *General Instructional Objective*

You should understand the principles of invasive pressure monitoring and its relevance to clinical practice.

##### *Required Abilities and Qualities*

- a. Know the functions of the components of an invasive pressure monitoring system (catheter, tubing, transducer, amplifier and display unit)
- b. Know correct zero and calibration techniques
- c. Understand the principles involved in optimising the dynamic response characteristics of the catheter-tubing-transducer set up and how the natural frequency and damping coefficient determine the dynamics of the system
- d. Know the indications for invasive pressure monitoring
- e. Know the limitations of invasive pressure monitoring

#### 7.3.3 **Pulse oximetry**

##### *General Instructional Objective*

You should understand the principles of pulse oximetry and its relevance to clinical practice.

##### *Required Abilities and Qualities*

- a. Understand the physical principles of pulse oximetry
- b. Know the indications for pulse oximetry
- c. Know the limitations of pulse oximetry and the causes of erroneous readings

- d. Recognise changes that are potentially life threatening

#### 7.3.4 **Monitoring of ventilation**

##### *General Instructional Objective*

You should understand the principles of monitoring of ventilation and its relevance to clinical practice.

##### *Required Abilities and Qualities*

- a. Know the significance of respiratory rate, tidal and minute volume; mean, peak, end inspiratory and plateau pressure and end expiratory pressure (intrinsic and extrinsic); inspired oxygen concentration; arterial blood gas and acid base status
- b. Know the effect of ventilation upon cardiovascular and oxygen delivery parameters

#### 7.3.5 **End tidal CO<sub>2</sub> monitoring**

##### *General Instructional Objective*

You should understand the principles of end tidal CO<sub>2</sub> monitoring, its relevance to clinical practice and be able to use it effectively.

##### *Required Abilities and Qualities*

- a. Understand the physical principles involved in end tidal CO<sub>2</sub> monitoring
- b. Know the relationship between end tidal CO<sub>2</sub> and arterial PCO<sub>2</sub> in various clinical circumstances
- c. Know the indications for end tidal CO<sub>2</sub> monitoring
- d. Know the limitations of end tidal CO<sub>2</sub> monitoring

#### 7.3.6 **Haemodynamic monitoring using a pulmonary artery catheter**

##### *General Instructional Objective*

You should understand the principles of invasive haemodynamic monitoring using a pulmonary artery catheter and its relevance to clinical practice.

##### *Required Abilities and Qualities*

- a. Understand the significance of and the relationships between central venous pressure, mean pulmonary artery pressure, pulmonary artery diastolic pressure, pulmonary artery wedge pressure, mean systemic arterial pressure, cardiac output and how relationships may change in a range of clinical circumstances (e.g. cardiac tamponade, hypovolaemic shock)
- b. Understand measurement of cardiac output by thermodilution

### 7.3.7 Others

- a. Understand the determinants of cerebral blood flow, CSF production and ICP. Understand the principles of ICP measurement and its relationship to cerebral perfusion pressure
- b. Know the range and reliability and understands the indications for use and interpretation of the common laboratory tests relevant to intensive care practice and order them appropriately.
- c. Know the indications for a CXR in ICU patients
- d. Know the limitations of CXRs in ICU patients
- e. Know the range of normal features on the CXR
- f. Understand the principles of diagnostic electrocardiography.
- g. Know the various types of respiratory function tests and their indications for use
- h. Understand the principles of electroencephalography (EEG) and evoked potentials.
- i. Understand the principles of diagnostic echocardiography.

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## (8) CARDIOPULMONARY RESUSCITATION

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### 8.1 Introduction

Cardiopulmonary resuscitation of a critically ill or injured patient may be required within the hospital in the Intensive Care Unit, emergency department or in a hospital ward or department or outside the hospital whilst on a patient retrieval or attendance at a disaster scene.

### 8.2 Cardiopulmonary Resuscitation

#### *General Instructional Objective*

As a trainee you should understand and apply the principles of resuscitation for respiratory or cardiorespiratory arrest in patients of all ages. You should appreciate that the time to basic life support and defibrillation are the critical variables in the probability of survival from cardiac arrest.

#### *Required abilities and Qualities*

- a. Recognise symptoms and signs of impending cardiac arrest
- b. Know the causes of cardiorespiratory arrest and seek to identify the cause in individual cases (especially the rapidly reversible causes)
- c. Know the effects of cardiorespiratory arrest on body systems
- d. Know and apply corrective treatment
- e. Construct a plan of management for cardiac arrests due to shockable (ventricular fibrillation and pulseless ventricular tachycardia) and non-shockable rhythms (including asystole and pulseless electrical activity)

- f. Demonstrate techniques to clear and maintain the airway, the use of mouth-to-mask ventilation, and the use of self-inflating hand held resuscitators on patients and models
- g. Understand the principles and demonstrate techniques of external cardiac compression
- h. Demonstrate combined ventilation and external cardiac compression in one person and two person rescue
- i. Know the indications and demonstrate the operation of external defibrillators (manual and automated [shock advisory])
- j. Know techniques of access to the circulation
- k. Diagnose cardiac dysrhythmias
- l. Understand anti-dysrhythmic therapy
- m. Know the latest protocols of the Australian Resuscitation Council for management of cardiorespiratory arrest (See website: [www.resus.org.au](http://www.resus.org.au))

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## **(9) TRANSPORT OF CRITICALLY ILL PATIENTS**

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### **9.1 Introduction**

Transportation of critically ill patients is required in a number of circumstances. It may be pre-hospital, intra-hospital for diagnostic and/or therapeutic interventions and interhospital for specialised diagnostic procedures and/or therapy that is only available in tertiary intensive care units. Transport may be required on an emergency or semi-elective basis. The principle governing transport of critically ill patients is to maximise safety and at the same time to maintain or improve the patient's clinical status during retrieval.

### **9.2 Organisation and Operation of Retrieval Services**

#### *General Instructional Objectives*

You should understand the principles, problems and risks, and apply this knowledge to ensure appropriate and safe transport of critically ill patients.

#### *Required Abilities and Qualities*

- a. Know and apply the principles underlying safe transport of critically ill patients of all ages
- b. Understand the importance of prior planning and organisation of retrieval services
- c. Understand the requirement for stabilization and support of the critically ill patient before transport is commenced
- d. Appreciate the importance of communication between referring, transporting and receiving staff

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## **(10) TECHNICAL SKILLS**

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### **10.1 Introduction**

As a trainee you should be starting to become proficient in a wide range of technical skills necessary for therapeutic and monitoring purposes. The ability to perform procedures must be accompanied by knowledge of normal anatomy, indications, contraindications and complications. The latter includes not only physical hazards, but possible delays in instituting obviously needed therapy, whilst procedures are undertaken, and the possibility of obtaining and acting upon wrong information. It is imperative that the patient is properly monitored and supported during procedures.

### **10.2 *General Instructional Objective***

You should know what preliminary measures must be undertaken, confirm that they have been done and then skilfully perform core procedures in a manner, which minimises the risks of complications.

#### *Required Abilities and Qualities*

- a. Perform core procedures
- b. Seek assistance to perform those procedures that are not core
- c. Understand the importance of preparation before undertaking a procedure
- d. Know relevant anatomy and how physiological function may be altered during the procedure
- e. Know the complications, how to recognise them and institute appropriate management
- f. Perform the procedure and carry out continuing management in a manner that minimises the risks of complications

### **10.3 Examples include, but are not restricted to:**

#### **10.3.1 Insertion of a Central Venous Catheter**

##### *General Instructional Objective*

You should know and use the necessary preliminary measures and then skilfully insert the catheter whilst minimising the risks of complications.

##### *Required Abilities and Qualities*

- a. Obtain informed consent from the patient or guardian where appropriate
- b. Check the ready availability of functional resuscitation equipment and ensure close observation, continuous ECG monitoring and pulse oximetry are being undertaken

- c. Know the complications of the technique, how to recognise them and initiate appropriate management
- d. Ensure the correct setting up, zero and calibration of pressure monitoring equipment
- e. Choose an appropriate route of insertion and position the patient correctly
- f. Prepare for the procedure so it can be performed in an aseptic manner (e.g. scrub, gown and glove, prepare a sterile field and apply sterile drapes)
- g. Check that appropriate instruments and equipment are available and functional.
- h. Infiltrate the skin and subcutaneous tissue with local anaesthetic where appropriate
- i. Use knowledge of anatomy and appropriate tools when cannulating the vein
- j. Insert the catheter using techniques to eliminate risk of air embolism
- n. Secure the catheter
- o. Apply a sterile dressing
- p. Obtain further appropriate investigations to confirm positioning and exclude complications (e.g. a chest x-ray to confirm correct intra-thoracic catheter position and exclude pneumothorax)

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## **(11) ETHICS**

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### **11.1 Introduction**

An understanding of the principles of ethics is essential for development and maintenance of the highest standards of practice, teaching and research in intensive care medicine.

### **11.2 Principles of Medical Ethics**

#### *General Instructional Objective*

You should understand the concepts of patient autonomy, beneficence, non-maleficence and justice (as it applies to fair distribution of resources). You should understand and conform to the principles of informed consent, privacy and confidentiality, patient dignity, fiduciary responsibility, honesty, safety and quality.

#### *Required Abilities and Qualities*

- a. Understand that patients or, their surrogates (under some circumstances) have the right to accept or reject a treatment being offered (with due regard to the principles of truthful disclosure and informed consent)
- b. Understand the issues and principles involved in withholding and withdrawing treatment, and the care of the dying patient
- c. Understand that the decision to withhold or withdraw treatment does not imply the termination of care

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## **(12) COMMUNICATION**

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### **12.1 Introduction**

The ability to communicate effectively is an essential attribute of the competent intensive care trainee. Such communication involves other ICU staff (other specialists, junior medical staff, nurses and paramedical staff), referring or consulting medical staff from outside the ICU, and patients and their families.

### **12.2 Effective Communication**

#### *General Instructional Objective*

You should understand the role of communication skills in the effective functioning of an intensive care specialist and be able to access relevant resources to develop your own communication skills to an appropriate level.

#### *Required Abilities and Qualities*

Recognise the need for effective communication with patients and/or their families, and medical and non-medical colleagues

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## **(13) CLINICAL AUDIT AND QUALITY IMPROVEMENT**

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### **13.1 General Instructional Objective**

You should be able to undertake clinical audit and perform effective quality improvement activities.

#### *Required Abilities and Qualities*

- a. Understand the need for and be able to assist with clinical audit (eg. mortality reviews, complications etc) and review of other clinical indicators
- b. Understand the purpose and process of other quality improvement activities such as evidence based practice, best practice guidelines, bench marking and critical pathways

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## **(14) EDUCATION**

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### **14.1 Introduction**

Learning all aspects of the practice of intensive care medicine is fundamental to becoming a competent specialist. An understanding of educational principles will support the process of continuing education throughout professional life. Teaching of medical colleagues and other health professionals is both a responsibility and a continuing learning experience for you as a teacher.

### **14.2 Principles of Adult Learning**

#### *General Instructional Objective*

You should understand the factors that promote adult learning.

#### *Required Abilities and Qualities*

- a. Know that learning is most effective when derived from the experience of the learner and from their active participation in the learning process
- b. Understand that a problem-solving mode, rather than a solution giving one, is required
- c. Understand the requirement for self-dependence rather than dependency on any expert
- d. Know that objectives are best when they arise out of the interests and needs of the learner
- e. Appreciate that the relationship between learner and teacher should be characterised by mutual trust, acceptance and respect
- f. Know that feedback from teacher and peers provides benefit and support
- g. Understand that the environment for learning needs to be physically comfortable
- h. Know that humour and laughter improve the learning climate

### **14.3 Learning and Teaching**

#### *General Instructional Objective*

You should understand that learning and teaching are ongoing rights and responsibilities of trainees and you should use the principles of adult learning.

#### *Required Abilities and Qualities*

Use the principles of adult education to promote individual learning, teaching and continuing personal education

## **APPENDIX 1 - REPRESENTATIVE LIST OF TREATMENTS**

**By the end of Basic Training you should understand the mode of action, indications, contraindications, safe use and prevention of complications of these treatments.**

### Fluid Therapy

- crystalloid
- colloid
- blood transfusion
- blood component

### Drug Therapy

- inotropic agents (catecholamine and non-catecholamine)
- vasodilators
- vasoconstrictors
- anti-arrhythmics
- analgesics including narcotics, NSAIDs
- sedatives
- neuromuscular blockade
- antiulcer therapy
- antimicrobial agents (e.g. bacterial, viral, fungal, rickettsial)
- corticosteroids
- anticoagulants, thrombolytics, fibrinolytics
- procoagulants

### Respiratory Therapy

- oxygen therapy
- CPAP/BiPAP
- mechanical ventilation,
- weaning from ventilation
- humidification
- suction systems
- tracheostomy care including assessment for decannulation
- facilitation of swallowing and communication

### Cardiac Support

- use of inotropes, constrictors, dilators
- pacemaker insertion
- intra-aortic balloon pumping
- cardioversion & defibrillation

### Renal Replacement Therapy

- haemo(dia)-filtration techniques
- haemodialysis
- peritoneal dialysis
- haemoperfusion
- plasmapheresis

## Analgesia

- Patient Controlled Analgesia
- Major regional techniques (eg. spinal and epidural analgesia)

**APPENDIX 2 - REPRESENTATIVE LIST OF PROCEDURES RELEVANT TO THE INTENSIVE CARE SPECIALIST**

**By the end of Basic Training you should understand the safe use of these procedures including principles, indications, errors, contraindications and prevention of the complications. At this time, you should also be able to perform most of these procedures with or without supervision.**

Cardiopulmonary Resuscitation and airway support

- expired air resuscitation
- bag-and-mask ventilation
- endotracheal intubation and means to avoid complications
- external chest compression
- defibrillation/cardioversion

Vascular Access

- peripheral venous cannulation
- central venous (subclavian, jugular, femoral)
- radial and femoral arterial cannulation

Pleural drainage

- needle or tube

Setting appropriate parameters for mechanical ventilation

Non-invasive monitoring of blood pressure, ECG and respiratory function

Invasive Monitoring

-Right heart catheterisation (assessment of CVP, PAWP, cardiac output)

Insertion of epidural catheter

Insertion of nasogastric and nasojejunal tubes

Insertion of Sengstaken-Blakemore or other balloon tamponade tube

Lumbar puncture

Continuous EEG monitoring including integrated signals (e.g. bispectral index)

Intra-abdominal pressure monitoring

Neuromuscular monitoring