JFICMI Paediatric Critical Care Curriculum & Minimum Training Requirements

1) INTRODUCTION

The overall objective of training in paediatric critical care medicine under the auspices of the JFICMI is to equip trainee doctors with the skills – clinical, procedural and non-clinical – and attitudes to provide high quality specialist care to critically ill children in Ireland, in both regional and metropolitan settings. The training programme reflects this overarching objective, using a competency based model derived from the RCPCH - UK curriculum.
The JFICMI training programme is divided into 12 competency domains, comprehensively representing all the key aspects of training for specialist practice. These domains are described as follows:

1. Resuscitation and initial management of the acutely ill patient
2. Diagnosis – assessment, investigation, monitoring and data interpretation
3. Disease management
4. Therapeutic interventions/organ system support in single or multiple organ failure
5. Safe use of practical procedures
6. Peri-operative care
7. Comfort and recovery
8. End of life care
9. Adult care
10. Transport
11. Patient safety and health systems management
12. Professionalism

For each of these domains, the curriculum below provides a detailed list of:

(a) expected learning outcomes for doctors who have completed intensive care medicine training
(b) knowledge required to achieve competency in the domain
(c) skills required to achieve competency in the domain
(d) relevant links to the Medical Council's Eight Domains of Professional Practice

DETAILED LIST OF CURRICULUM DOMAINS

DOMAIN 1: RESUSCITATION & INITIAL MANAGEMENT OF THE ACUTELY ILL CHILD

LEARNING OBJECTIVES – THE TRAINEE IS ABLE TO:

- *Adopt a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill paediatric patient with disordered physiology*
- *Manage cardiopulmonary resuscitation*
- *Recognises a child requiring airway intervention*
- *Adopts a structured and timely approach to the recognition, assessment and stabilisation of the acutely ill paediatric patient with disordered physiology.*
- *Manages cardiopulmonary resuscitation.*
- *Recognises a child requiring airway intervention.*
- *Hand ventilates a child and young person with severe respiratory compromise.*
- *Performs intubation safely with appropriate use of anaesthetic agents, sedatives, analgesics and muscle relaxants.*
- *Performs intubation in the collapsed patient.*
- *Manages the unanticipated difficult airway safely until help arrives.*
- *Applies the principles of temporary pacing and the different modes used.*
- *Recognises and manages the various cardiac rhythms.*
- *Manages the patient post-resuscitation.*
- *Triaged and prioritises patients appropriately, including timely admission to PICU.*
- *Assesses and provides initial management of the trauma patient.*
- *Priorities and manages time critical injuries.*
- *Assesses and provides initial management of the patient with burns.*
- *Describes the management of mass casualties.*
- *NON ANAESTHESIA trainees- complete a minimum 6-month post in Anaesthesiology.*

KNOWLEDGE

- General acute illness
    - Awareness and interpretation of the early warning signs of critical illness, including impending airway, breathing, cardiovascular and/or neurological failure
    - Measures of adequacy of airway, breathing and cardiovascular system
    - Recognition of life threatening changes in physiological parameters
    - Recognition of when organ dysfunctions or failure are an immediate threat to life
    - Causes of cardio-respiratory arrest, identification of patients at risk and corrective treatment of reversible causes
    - Causes, recognition and management of: acute chest pain, tachypnoea & dyspnoea, upper and lower airway obstruction, pulmonary oedema, pneumothorax (simple & tension), hypoxaemia, hypotension, shock states, anaphylactic and anaphylactoid reactions, hypertensive emergencies, acute confusional states and altered consciousness, acute seizures and convulsions, oliguria and anuria, acute disturbances in thermoregulation, acute abdominal pain
    - Treatment algorithms for common medical emergencies
    - The modification of resuscitation techniques in the special circumstances of hypothermia, immersion and submersion, poisoning, pregnancy, electrocution, anaphylaxis, acute severe asthma and trauma
    - Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
      Principles, including indications, limitations and therapeutic modalities of basic radiological methods, CT scanning, MRI, ultrasound, angiography and radio nucleotide studies in the critically ill patient

- Cardiovascular acute illness
    - Cardiopulmonary resuscitation
    - Indications, dosages and actions of drugs used in the peri-arrest period
    - Defibrillation: principles of monophasic & biphasic defibrillators; mechanism, indications, complications, modes and methods (manual and automated external defibrillators (AED))
    - Cardiac arrhythmias and the principles of their management (treatment algorithm): peri-arrest arrhythmias (bradycardia, broad complex tachycardia, atrial fibrillation, narrow complex tachycardia); ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT); non-VF / VT rhythms (asystole/PEA); when not to start and when to cease cardiopulmonary resuscitation
    - Management of the "blue baby" and the indications for prostin
    - Congenital Heart Disease
    - Indications, doses and actions of primary drugs used in the management of a cardiac arrest (inc. special precautions and contraindications)
    - Indications and methods of cardiac pacing in the peri-arrest setting
    - Effect of cardio-respiratory arrest on body systems
    - Principles and application of targeted temperature management after cardiac arrest
    - Immediate management of acute coronary syndromes

- Respiratory acute illness
    - Indications for and methods of ventilatory support
    - Non-traumatic respiratory emergencies: pneumonia; pneumothorax; pulmonary embolism; massive pleural effusion; acute respiratory distress syndrome; acute severe asthma
    - Traumatic respiratory emergencies: acute airway emergencies; tension pneumothorax; haemothorax; pulmonary contusions; pulmonary embolus; bony injury and flail chest; high spinal cord injury
    - Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/pARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
    - Tracheal route for drug administration: indications, contraindications, dosage

- Neurological acute illness
    - Methods for assessing neurological function e.g. Glasgow Coma Scale
    - Altered consciousness; post-anoxic brain injury; intracranial haemorrhage and infarction; spinal cord injury
    - Principles of management of traumatic brain injury: coup and contra-coup injuries; methods of preventing 'secondary insult' to the brain; recognition and immediate management of raised intracranial pressure

- Renal acute illness
    - Acute kidney injury
    - Recognition of pre-renal, renal and post-renal causes of AKI
    - Measures to reverse renal hypoperfusion
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- Polytrauma patient
    - Methods for securing vascular access rapidly
    - Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle
    - Techniques for effective fluid resuscitation
    - Principles of blood and blood component therapy; principles of massive transfusion
    - Performance and interpretation of a primary and secondary survey
    - Environmental hazards & injuries: hypo- and hyperthermia, near-drowning, electrocution, radiations, chemical injuries, electrical safety/micro shock
    - Relevance of mechanism of injury to clinical presentation
    - Effects and acute complications of severe trauma on organs and organ systems:
    - Gastrointestinal - abdominal trauma; abdominal tamponade; rupture of liver or spleen
    - Musculoskeletal system - soft tissue injury; short term complications of fractures; fat embolism; crush injury & compartment syndromes; maxillofacial injuries
    - Secondary insults that potentiate the primary injury
    - Immediate specific treatment of life-threatening injury
    - Management of cervical spine injuries
    - Management of severe acute haemorrhage and blood transfusion; correction of coagulation disorders and haemoglobinopathies

- The burned patient
    - Pathophysiology and medical/surgical management of the phases of a burn injury
    - Calculation of area burned
    - Principles of calculation of fluid losses & fluid resuscitation in the burned patient
    - Respiratory complications of burn injuries (smoke inhalation, airway burns) - detection and management
    - Burn-related compartment syndrome and escharotomy
    - The environmental control necessary for optimal care of the burned patient
    - Recognition and management of acute disturbances in thermoregulation
    - Prevention of infection in the burned patient

- Non-clinical
  - Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
  - Legal and ethical issues relating to the use of the recently dead for practical skills training, research and organ donation
  - Relevance of prior health status in determining risk of critical illness and outcomes
  - Triage and management of competing priorities
  - Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
  - Organisational principles for the coordination and management of mass casualties
  - Characteristics and clinical presentations associated with major incidents caused by natural or civilian disasters, infection epidemics or terrorist attack
  - Local major incident plan - the role of the ICU in hospital/community disaster plans
  - Electrical safety: conditions which predispose to the occurrence of macro-shock / micro-shock; physical dangers of electrical currents; relevant standards regarding safe use of electricity in patient care; basic methods to reduce electrical hazards
  - Communication tasks and personal role in major incident / accident plan
  - Principles of internal hospital communication
  - Management of public relations and information
  - Alternative forms of external communication
  - Triage methods in use locally
  - Decontamination procedures
  - Principles of crisis management, conflict resolution, negotiation and debriefing
  - Psychological support for patients and relatives
  - Risks to the rescuer during resuscitation & methods to minimise these

SKILLS

- Consider legal and ethical issues: patient autonomy, appropriateness of resuscitation and ICU admission
- Consider legal and ethical issues with respect to the safeguarding of children
- Conduct a primary survey: obtain relevant information rapidly and accurately
- Recognise signs and symptoms of impending cardiac arrest
- Assess conscious level, status of airway and cervical spine, and conduct careful systems review
- Order and prioritise appropriate investigations
- Use emergency monitoring equipment
- Monitor vital physiological functions as indicated
- Recognise and rapidly respond to adverse trends in monitored parameters
- Check & assemble resuscitation equipment
- Demonstrate advanced life support skills (APLS standard or equivalent)
- Use a defibrillator safely
- Initiate routine investigations during resuscitation to exclude reversible problems (e.g. hyperkalaemia)
- Recognise and manage choking / obstructed airway
- Implement emergency airway management, oxygen therapy and ventilation as indicated
- Demonstrate emergency relief of tension pneumothorax
- Obtain vascular access sufficient to manage acute haemorrhage, rapid fluid infusion and monitor cardiovascular variables
- Perform interosseous cannulation
- Initiate emergency cardiac pacing
- Act appropriately as a member or leader of the team (according to skills & experience)
- Respond to an emergency in a positive, organised and effective manner; able to direct the resuscitation team
- Support relatives witnessing an attempted resuscitation
- Participate in timely discussion and regular review of 'do not resuscitate' orders and treatment limitation decisions
- Assess and communicates effectively the risks and benefits of intensive care admission
- Discuss treatment options with a patient or relatives before ICU admission
- Take decisions to admit, discharge or transfer patients
- Consider the need for stabilisation before transfer
- Determine when the patient's needs exceed local resources or specialist expertise (requirements for transfer)

- Explain life-sustaining therapies, in clear language, and describe the expected outcome of such therapies in view of the patient's goals and wishes.
- Professional and reassuring approach - generates confidence and trust in patients and their relatives
- Assess and document Glasgow Coma Scale (GCS)
- Examine and plan care for the confused patient
- Perform a comprehensive secondary survey; integrate history with clinical examination to form a differential diagnosis
- Prioritise the order of investigations and interventions for individual injuries according to their threat to life
- Protect a potentially unstable cervical spine
- Assess, predict and manage circulatory shock
- Assess burn severity and prescribe initial fluid resuscitation
- Estimate burn wound mortality from published data tables
- Describe the endpoints of burn resuscitation and preferred fluids
- Prescribe appropriate analgesia
- Identify or describe risk factors for airway compromise in the burned patient
- Identification and management of carbon monoxide poisoning
- Lead, delegate and supervise others appropriately according to experience and role
- Recognise and manage emergencies; see assistance appropriately

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: DOPS; CbD; Mini-CEX
    - Entrustable professional activities: rated using workplace-based assessment tools
    - Logbook review with training supervisor
    - Intensive Care Simulation course (JFICMI) – desirable

- Difficult airway workshop (College of Anaesthetists) – desirable
    - Critical Care Refresher course (JFICMI) – desirable
    - APLS – mandatory
    - ATLS – desirable
    - Trainee clinical and educational presentations

- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor
    - Final "sign-off" meeting between trainees and Training Committee members to ensure all training requirement satisfactorily completed.

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Communication and interpersonal skills
- Collaboration and teamwork
- Scholarship
- Professionalism
- Patient safety and quality of patient care

DOMAIN 2: DIAGNOSIS – ASSESSMENT , INVESTIGATION, MONITORING AND DATA INTERPRETATION

LEARNING OBJECTIVES – THE TRAINEE IS ABLE TO

- *Obtains a history and performs an accurate clinical examination.*
- *Undertakes timely and appropriate investigations.*
- *Performs electrocardiography (ECG) and interprets the results.*
- *Interprets +/- performs focused critical care transthoracic echocardiography.*
- *Interprets general critical care ultrasonography (thoracic, abdominal, cranial, vascular) and liaises with radiology colleagues.*
- *Obtains appropriate microbiological samples and interprets results.*
- *Obtains and interprets the results from blood gas samples.*
- *Interprets chest x-rays.*
- *Liaises with radiologists to organise and interpret clinical imaging.*
- *Monitors and responds to trends in physiological variables.*
- *Integrates clinical findings with laboratory investigations to form a differential diagnosis.*

KNOWLEDGE

- Importance and principles of obtaining an accurate history of the current condition, comorbidities and previous health status
- Clinical signs associated with critical illness, their relative importance and interpretation
- Sources and methods of obtaining clinical information
- Relevance of prior health status in determining risk of critical illness and outcomes
- Significance and impact of co-morbid disease on the presentation of acute illness
- Impact of drug therapy on organ-system function
- Indications for and the selection of suitable methods of monitoring or investigation taking into account their accuracy, convenience, reliability, safety, cost and relevance to the patient's condition.
- Sensitivity and specificity of the investigation as related to a specific disease
- Appropriate use of laboratory tests to confirm or refute a clinical diagnosis
- Methods and routes of obtaining samples - associated indications and complications
- Indications, limitations and basic interpretation of laboratory investigations of blood and other body fluids (e.g. urine, CSF, pleural and ascitic fluids):
    - Haematology
    - Immunology
    - Cytology
    - Blood grouping and x-matching
    - Urea, creatinine, glucose, electrolytes and lactate
    - Liver function tests
    - Drug levels in blood or plasma
    - Tests of endocrine function (diabetes, thyroid disorders, adrenal failure)
    - Blood gas samples (arterial, venous and mixed venous)
    - Microbiological surveillance and clinical sampling
- Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between colonisation & infection
- Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
- Principles of aseptic technique and aseptic handling of invasive medical devices
- Local patterns of bacterial resistance and antibiotic policy; difference between contamination, colonisation and infection

- Interpretation of information from monitoring devices, and identification of common causes of error; principles of monitoring trends of change and their significance
    - Liver function tests
    - Drug levels in blood or plasma
    - Tests of endocrine function (diabetes, thyroid disorders, adrenal failure)
    - Blood gas samples (arterial, venous and mixed venous)
    - Microbiological surveillance and clinical sampling
- Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between colonisation & infection
- Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
- Principles of aseptic technique and aseptic handling of invasive medical devices
- Local patterns of bacterial resistance and antibiotic policy; difference between contamination, colonisation and infection
- Interpretation of information from monitoring devices, and identification of common causes of error; principles of monitoring trends of change and their significance
- Hazards of inappropriate monitoring including misuse of alarms; principles of disconnection monitors
- Principles of invasive pressure monitoring devices: components & functions of an electromanometer system (catheter, tubing, transducer, amplifier and display unit); zero and calibration techniques; dynamics of the system - natural frequency and damping
- Anatomy and physiology of the heart and cardiovascular system
- Principles of haemodynamic monitoring - invasive & non-invasive methods, indications & limitations, physiological parameters and waveform interpretation
- Recognition of life threatening changes in physiological parameters
- Invasive & non-invasive systems available for measuring cardiac output and derived haemodynamic variables, the principles involved and the type and site of placement of the monitoring device
- Interpretation of, relationships between, sources of error and limitations of measured and derived cardiovascular variables including pressure, flow, volume and gas transport
- Methods for measuring temperature
- Principles, indications and limitations of pulse oximetry
- Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change & QT interval) - indications, limitations and techniques. Advantages and disadvantages of different lead configurations

- Clinical measurement: pH, pCO2, pO2, SaO2, FiO2, CO2 production, oxygen consumption, respiratory quotient
- Principles of monitoring ventilation - significance of respiratory rate, tidal volume, minute volume, mean, peak, end expiratory and plateau pressure, intrinsic and extrinsic PEEP, inspired oxygen concentration, arterial blood gas and acid base status; relationship between mode of ventilation and choice of parameters monitored; airflow and airway pressure waveforms
- Physical principles, indications and limitations of end tidal CO2 monitoring, and relationship between end tidal CO2 and arterial pCO2 in various clinical circumstances
- Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle; arteries of the arms and legs
- Pre-analytical errors of arterial blood gas sampling (choice of sample site, sampling device, heparin, mixing, storage and transport)
- Homeostatic regulation of acid base balance and buffer ions (e.g. Na+, K+, Ca++, Cl-, HCO3-, Mg++, PO4-)
- Respiratory physiology: gas exchange, O2 and CO2 transport, hypoxia, hypo- and hypercarbia, functions of haemoglobin in oxygen carriage and acid-base balance
- Renal physiology: regulation of fluid and electrolyte balance
- Methods for assessing pain and sedation
- Methods for assessing neurological function e.g. Glasgow Coma Scale
- Systems available for intracranial pressure monitoring - indications, principles, type and site of placement of the monitoring device, data collection and trouble-shooting
- Indications and techniques of jugular bulb oximetry
- Principles, including indications, limitations and therapeutic modalities of basic radiological methods, CT scanning, MRI, ultrasound, angiography and radio nucleotide studies in the critically ill patient
- Risks to patient and staff of radiological procedures and precautions to minimise risk
- Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including pARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
- Effect of projection, position, penetration and other factors on the image quality

- Basic interpretation of radiological investigations:
    - Neck and thoracic inlet films
    - X-rays of abdominal fluid levels / free air
    - X-rays of long bone, skull, vertebral and rib fractures
    - CT or MRI scans of head demonstrating fractures / haemorrhage
    - Ultrasound of the abdomen (liver, spleen, large abdominal vessels, kidney, urinary bladder)
    - Echocardiography (ventricular function, filling status, effusion)
- Principles, indications, limitations and basic interpretation of:
    - Respiratory function tests
    - Diagnostic bronchoscopy
    - Diagnostic ECG (EKG)
    - Echocardiography
    - Electroencephalogram (EEG) and evoked potentials
    - Intra-abdominal pressure monitoring
    - Intrathoracic pressure (oesophageal pressure) measurements
    - Fluid input-output monitoring
- Basic principles of ultrasound and the Doppler effect

SKILLS

- Examine patients, elicit and interpret clinical signs (or relevant absence of clinical signs) in the ICU environment
- Obtain relevant information from the patient, relatives and other secondary sources
- Professional and reassuring approach - generates confidence and trust in patients and their relatives
- Integrate history with clinical examination to create a diagnostic and therapeutic plan
- Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
- Develop a working, and limited differential diagnosis based on presenting clinical features
- Recognise impending organ system dysfunction
- Order and prioritise appropriate investigations
- In emergency situations, confirm or refute early diagnoses before data collection / analysis is complete - make contingency plans based on these diagnoses to combat further threats to the patient's life
- Integrate clinical findings with results of investigations
- Interpret laboratory results in the context of the patient's condition
- Evaluate benefits and risks related to specific investigations
- Monitor vital physiological functions as indicated
- Obtain and accurately record data from monitors
- Set monitor alarms appropriately
- Differentiate real change from artefact & respond appropriately
- Identify deviations from normal range and interpret these in the context of the clinical circumstances
- Recognise and rapidly respond to adverse trends in monitored parameters
- Recognise patterns in trends - early diagnosis and outcome prediction
- Review the need for continued monitoring regularly Use emergency monitoring equipment

- Obtain and interpret data from:
    - Invasive and non-invasive arterial blood pressure measurement
    - ECG / EKG (3 and 12 lead)
    - Central venous catheters
    - Pulmonary artery catheters or oesophageal Doppler
    - Pulse oximetry
    - FVC, spirometry and peak flow measurement
    - Inspired and expired gas monitoring for O2, CO2 and NO
    - Intracranial pressure monitoring

- Set and interpret data from ventilator alarms
- Obtain blood gas samples using aseptic techniques; interpret data from arterial, central venous or mixed venous samples
- Confirm adequate oxygenation and control of PaCO2 and pH
- Obtain blood cultures using aseptic techniques
- Interpret chest x-rays in a variety of clinical contexts
- Interpret data from scoring or scaling systems to assess pain and sedation
- Assess and document Glasgow Coma Scale (GCS)
- Recognise changes in intracranial and cerebral perfusion pressure which are life threatening
- Identify abnormalities requiring urgent intervention
- Recognise significant changes and the need for repeated testing (i.e. that a single normal result is not as significant as identifying trends of change by repeated testing where indicated)
- Document investigations undertaken, results and action taken
- Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
- Undertake further consultation / investigation when indicated
- Communicate effectively with radiological colleagues to plan, perform and interpret test results
- Communicate and collaborate effectively with all laboratory staff
- Lead, delegate and supervise others appropriately according to experience and role

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: DOPS; CbD; Mini-CEX
    - Entrustable professional activities: rated using workplace-based assessment tools
    - Logbook review with training supervisor
    - Clinical microbiology / infectious disease multidisciplinary ward rounds – mandatory
    - ICU/Radiology multidisciplinary rounds – mandatory
    - Trainee clinical and educational presentations

- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook, review with training supervisor
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

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DOMAIN 3: DISEASE MANAGEMENT

LEARNING OBJECTIVES – THE TRAINEE IS ABLE TO UNDERTAKE THE PCCM MANAGEMENT OF

- *All aspects of upper airway obstruction*
- *Upper and lower respiratory tract infections (RTIs)*
- *Respiratory failure including asthma and acute chest crisis in patients with sickle cell disease.*
- *Cardiovascular collapse and the benefits of applying ventilation in these scenarios.*
- *Hypotension and heart failure.*
- *Shock with appropriate use of vasoactive medications.*
- *Anaphylaxis.*
- *Multi-organ dysfunction, with knowledge of the risks and outcomes.*
- *Systemic inflammatory response.*
- *Acute infections, including meningitis.*
- *Acute respiratory distress syndrome.*
- *Occult infection.*
- *Hypoglycaemia, including quantifying the glucose requirement.*
- *Hyperglycaemia, safety and effectively.*
- *Hyperthermia and rhabdomyolysis.*
- *Hyperkalaemia , including the underlying causes and risks.*
- *Raised ammonia, recognising and inborn error of metabolism.*
- *Metabolic disease.*
- *Liver failure, recognising the indications for liver transplantation.*
- *An extremely high white cell count and tumour lysis syndrome.*
- *Ontological conditions presenting to the PCCU.*
- *Immunodeficiency states.*
- *Haematological disorders e.g. sickle cell.*
- *Obesity in the PCCU.*
- *Neuromuscular problems, including diagnosis, treatment and support.*

- *Peripheral weakness after critical illness.*
- *Obesity and its impact on the critically ill patient.*
- *Reduced level of consciousness.*
- *Acute neurological emergencies, including status epileptics.*
- *Diabetic ketoacidosis(DKA) and associated cerebral oedema.*
- *Acute hydrocephalus.*
- *Endocrine abnormalities.*
- *Hepato-renal syndrome.*
- *Major post-operative conditions (e.g. spinal, airway, neonatal and cardiac).*
- *Major post-operative risks.*
- *Neurosurgical patient.*
- *Necrotising enterocolitis (NEC), tracheoesphageal fistula (TOF) and congenital diaphragmatic hernia (CDH).*
- *Serious occult injury in any child with suggestive history.*
- *A child with traumatic and non-traumatic head injury.*
- *A child with poly trauma, including primary and secondary surveys.*
- *Most commonly injected or ingested poisons.*
- *Pressure wounds.*
- *The "blue baby". Including advising on the need for prostin.*
- *Congenital heart disease.*
- *Post cardiac bypass/hypothermia/circulatory arrest.*
- *Myocarditis.*
- *Suspected poisoning and investigation of same.*
- *Non traumatic physical injuries and investigation of same.*
- *All aspects of upper airway obstruction.*
- *A child and young person with fluid and inotrope resistant shock.*
- *Institution of cervical spine immobilisation in any at risk child.*
- *Acute burn injury and complications.*
- *Acute drowning and complications.*
- *Hanging injury and resultant cerebral oedema.*
- *Acute spinal injury.*

- *Appropriately identifies and manages diabetes insipidus.*
- *Longer term complications of severe trauma.*
- *Acute and chronic pulmonary hypertension.*
- *Applies knowledge of the coagulation profile and manages appropriately.*
- *Coordinates a multidisciplinary team to investigate a safe guarding issue.*
- *Acute kidney injury and conditions associated with same and the application and management of haemofiltration/ dialysis in the PCCU.*
- *Applies the principles of cardiac transplantation, understanding the outcomes.*
- *Applies knowledge of the principles and application of extracorporeal life support (ECLS).*

KNOWLEDGE

- Pathophysiology, diagnosis and management of commonly encountered acute and chronic medical conditions including:
- RESPIRATORY DISORDERS: the unprotected airway; pneumonia; lung or lobar collapse; asthma; pulmonary oedema; paediatric acute respiratory distress syndrome (pARDS) and causative factors; acute chest crisis; pulmonary haemorrhage; pulmonary embolus; pleural effusion; pneumothorax (simple and tension); upper and lower airway obstruction including epiglottitis; respiratory muscle disorders; pulmonary fibrosis; pulmonary thrombo-embolic disease
- CARDIOVASCULAR DISORDERS: shock states (cardiogenic, hypovolaemic, distributive, obstructive); congenital heart disease; duct dependent lesions; left ventricular failure; chronic heart failure; cardiomyopathies; myocarditis; valvular heart disease and prosthetic valves; vaso-occlusive diseases; pulmonary hypertension; right ventricular failure; cor pulmonale; malignant hypertension; cardiac tamponade; common arrhythmias and conduction disturbances, pacing box failure
- NEUROLOGICAL DISORDERS: acute confusional states and coma; hypoxic-ischaemic brain damage; intracranial haemorrhage and infarction; sub-arachnoid haemorrhage; cerebro-vascular accidents (CVA / stroke); convulsions and status epilepticus; meningitis and encephalitis; medical causes of raised intracranial pressure; acute neuromuscular diseases causing respiratory difficulty (e.g. Guillain-Barre, myasthenia gravis, malignant hyperpyrexia); critical illness polyneuropathy, motor neuropathy and myopathy; cerebro-vascular accidents (CVA / stroke)

- RENAL and GENITO-URINARY DISORDERS: urological sepsis; acute renal failure; chronic renal failure; renal manifestations of systemic disease including vasculitides; nephrotoxic drugs and monitoring; rhabdomyolysis
- GASTROINTESTINAL DISORDERS: necrotising enterocolitis; meconium ileus; tracheooesphageal fistula; congenital diaphragmatic hernia; upper GI haemorrhage; diarrhoea and vomiting; pancreatitis; cholecystitis; jaundice; acute and chronic liver failure; fulminant hepatic failure; paracetamol (acetaminophen)-induced liver injury; cirrhosis; inflammatory bowel diseases; peritonitis; ascites; mesenteric infarction; perforated viscus; bowel obstruction & pseudo-obstruction; abdominal trauma; intra-abdominal hypertension & compartment syndrome; short-bowel syndrome; rupture of liver or spleen; peptic/stress ulceration
- HAEMATOLOGICAL AND ONCOLOGICAL DISORDERS: disseminated intravascular coagulation (DIC) and other coagulation disorders, haemolytic syndromes, acute and chronic anaemia, immune disorders; lymphoproliferative disorders. High risk groups: the immunosuppressed or immune incompetent patient, chemotherapy, agranulocytosis and bone marrow transplant patients. Massive blood transfusion. Malignancy including complications of chemotherapy and radiotherapy

  INFECTIONS: pyrexia and hypothermia; organ-specific signs of infection including haematogenous (venous catheter-related, endocarditis, meningococcal disease), urological, pulmonary, abdominal (peritonitis, diarrhoea), skeletal (septic arthritis) soft tissue and neurological. Organisms causing specific infections: Gram positive and Gram negative bacteria, fungi, protozoa, viruses; nosocomial infections
- METABOLIC DISORDERS: electrolyte disorders; acid-base disorders; fluid-balance disorders; thermoregulation and associated disorders; Raised ammonia, recognising an inborn error of metabolism.
- ENDOCRINE DISORDERS: critical illness-induced hyperglycaemia; diabetes mellitus; over- and under-activity of thyroid; adrenal and pituitary disorders; sepsis-induced relative adrenal insufficiency; endocrine emergencies

- Investigation of impaired organ function
- Range of therapeutic interventions available to support organ function and treat the underlying causes
- Multi-system effects of acute medical conditions and implications for clinical management
- Indications and contraindications for treatment; circumstances when treatment is unnecessary or futile
- Therapies available for the treatment of commonly encountered medical conditions, their efficacy and potential side-effects
- Complications of specific therapies, their incidence and management
- Concept of risk: benefit ratio and cost effectiveness of therapies
- Complications of the disease processes; effects of disease and its treatments on other organ systems
- Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
- Impact of occupational and environmental exposures, socio-economic factors, and life style factors on critical illness
- Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems in predicting individual patient outcome
- Causes and consequences of decompensation in chronic organ failure; diagnosis and management of acute-on-chronic organ failure
- Long term effects of acute medical conditions and late complications
- Pathogenesis of multiple organ dysfunction (MODS) and the inflammatory response in relation to organ system dysfunction
- Risk factors, recognition and assessment of single or multiple organ failure
- Cardiopulmonary resuscitation
- Techniques for effective fluid resuscitation
- Use of fluids and vasoactive / inotropic / anti-arrhythmic drugs to support the circulation
- Use of mechanical assist devices to support the circulation
- Indications, complications, interactions, selection, monitoring, and efficacy of common antimicrobial drugs (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)

- Local patterns of bacterial resistance and antibiotic policy; difference between contamination, colonisation and infection
- Safe use of therapies which modify the inflammatory response
- Principles of management of closed head injury
- Coup and contra-coup injuries
- Methods of preventing the 'second insult' to the brain
- Methods for assessing neurological function e.g. Glasgow Coma Scale
- Principles of cerebral perfusion pressure, cerebral oxygenation and the methods by which they may be optimised
- Factors and therapies which may influence intracranial and cerebral perfusion pressure
- Application of techniques to treat or induce hypo/hyperthermia
- Systems available for intracranial pressure monitoring - indications, principles, type and site of placement of the monitoring device, data collection and trouble-shooting
- Cerebral spinal fluid (CSF) drainage for raised ICP
- Indications, contraindications and complications of lumbar puncture
- Management of vasospasm
- Principles of measurement of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.
- Principles, indications and limitations of electroencephalogram (EEG) and evoked potentials
- Indications for urgent imaging of the brain and neurosurgical consultation
- Functions of the liver - biosynthetic, immunologic, and detoxification
- Signs and symptoms of acute liver failure and assessment of severity
- Causes and complications of acute and acute-on-chronic liver failure, their prevention and management
- Supportive therapy for the failing liver including extracorporeal liver support and indications for emergency liver transplantation
- Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken-Blakemore)
- Etiology and management of raised intracranial pressure (ICP)
- Hepatotoxic drugs and adjustment of drug doses in hepatic impairment / failure
- Indications for transcutaneous & transjugular liver biopsies and transjugular intrahepatic portosystemic shunt (TIPSS)
- Principles of blood glucose control: indications, methods, monitoring of safety & efficacy
- Causes and complications of renal failure - methods to prevent or treat these
- Signs, symptoms and causes of renal failure (acute / chronic / acute on chronic) and indications for intervention

- Distinguishing features of acute versus chronic renal failure and implications for management
- Investigation of impaired renal function
- Indications, complications and selection of renal replacement therapies (continuous and intermittent)
- Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
- Urinary catheterisation techniques: transurethral and suprapubic
- Factors and therapies which may influence intra-abdominal pressure; etiology and management of raised intra-abdominal pressure
- Principles of nutritional assessment and support
- Signs and symptoms of acute airway insufficiency and acute respiratory failure, and indications for intervention
- Causes of respiratory failure, their prevention and management
- Indications for and methods of invasive and non-invasive mechanical ventilation Modes of mechanical ventilation - indications, contraindications & expected results of each mode (CMV, PRVC, HFOV, SIMV, PS, CPAP, NAVA, BiPAP, NIV). Initial set-up and modification of ventilator settings according to the condition or response of the patient
- Lung protective ventilation for acute lung injury (ALI)
- Pharmacological and non-pharmacological adjunct therapies for ALI
- Detection and management of haemo/pneumothorax (simple and tension)
- Principles of weaning from mechanical ventilation and factors which may inhibit weaning
- Potential adverse effects and complications of respiratory support and methods to minimise these
- Indications for and basic interpretation of chest radiographs: range of normal features on a chest x-ray; collapse, consolidation, infiltrates (including ALI/pARDS), pneumothorax, pleural effusion, pericardial effusion, position of cannulae, tubes or foreign bodies, airway compression, cardiac silhouette, mediastinal masses
- Ventilator associated pneumonia: definition, pathogenesis and prevention
- Principles of extra-corporeal life support (ECLS)
- Pathogenesis, definitions and diagnostic criteria of sepsis and septic shock.
- Occult indicators of sepsis
- Causes, recognition and management of sepsis-induced organ dysfunction; multi-system effects of sepsis and their impact on clinical management

- Prognostic implications of multiple systems dysfunction or failure
- Evidence based guidelines: sepsis care bundles - rationale and indications; principles of early goal-directed therapy
- Signs and symptoms of acute intoxication associated with common intoxicants
- Multi-system effects of acute intoxication and implications for clinical management
- General supportive therapy and specific antidotes pertinent to individual intoxicants
- Specific management of poisoning with aspirin, paracetamol/acetaminophen, paraquat, carbon monoxide, alcohol, ecstasy, tricyclic and quadricyclic antidepressants, benzodiazepines, amphetamines
- Strategies to reduce absorption and enhance elimination (haemodialysis, haemoperfusion, gastric lavage and charcoal therapy)
- Pharmacology of common intoxicants
- Indications for and basic interpretation of drug levels in blood or plasma
- Indications and complications of hyperbaric oxygenation
- Services available to patients and families to provide emotional or psychiatric support
- Awareness of the psychological impact of separation on the family

SKILLS

- Recognise and diagnose commonly encountered acute medical conditions (according to national case mix)
- Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
- Develop a working, and limited differential diagnosis based on presenting clinical features
- Recognise impending organ system dysfunction
- Order and prioritise appropriate investigations
- Establish a management plan based on clinical and laboratory information
- Critically appraise the evidence for and against specific therapeutic interventions or treatments
- Prioritise therapy according to the patient's needs
- Consider potential interactions when prescribing drugs & therapies
- Identify and manage chronic co-morbid disease
- Identify and evaluate requirements for continuation of chronic treatments during and after the acute illness
- Take chronic health factors into account when determining suitability for intensive care
- Evaluate the impact of chronic disease and prior health on outcomes
- Define targets of therapy and review efficacy at regular intervals
- Consider modifying diagnosis and/or therapy if goals are not achieved
- Optimise myocardial function
- Use fluids and vasoactive / inotropic drugs to support the circulation
- Identify and avoid factors contributing to impaired renal function
- Identify patients at risk of developing renal failure
- Initiate, manage and wean patients from renal replacement therapy
- Perform aseptic urinary catheterisation: male and female
- Identify patients at risk of acute liver failure
- Interpret laboratory tests of liver function
- Prevent, identify and manage hyper / hypoglycaemia
- Identify and manage coagulopathies
- Examine and plan care for the confused patient

- Assess and document Glasgow Coma Scale (GCS)
- Recognise changes in intracranial and cerebral perfusion pressure which are life threatening
- Take prompt action to reduce acutely elevated intracranial pressure
- Undertake or assist in the insertion and maintenance of an intracranial pressure monitor
- Obtain and interpret data from intracranial pressure monitoring
- Manage cardiorespiratory physiology to minimise rises in intracranial pressure
- Prevent, identify and treat hyponatraemia
- Implement emergency airway management, oxygen therapy and ventilation as indicated
- Demonstrate emergency relief of tension pneumothorax
- Perform thoracocentesis and manage intercostal drains
- Select the appropriate type and mode of ventilation for an individual patient
- Plan, implement, review and adapt lung protective approach during mechanical ventilation
- Plan, perform and review lung recruitment manoeuvres
- Assess, predict and manage circulatory shock
- Measure and interpret haemodynamic variables (including derived variables)
- Resuscitate a patient with septic shock using appropriate monitoring, fluid therapy and vasoactive agents
- Manage antimicrobial drug therapy
- Obtain and interpret results of microbiological tests
- Perform a lumbar puncture under supervision
- Describe and/or perform abdominal paracentesis
- Lead, delegate and supervise others appropriately according to experience and role
- Recognise and manage emergencies; seek assistance appropriately

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: DOPS; CbD; Mini-CEX
    - Entrustable professional activities: rated using workplace-based assessment tools
    - Logbook review with training supervisor
    - CHI ECLS Study Day mandatory
    - Trainee clinical and educational presentations

- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor: case mix of managed patients / record of procedures performed

Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Communication and interpersonal skills
- Collaboration and teamwork
- Scholarship
- Patient safety and quality of patient care

DOMAIN 4: THERAPEUTIC INTERVENTIONS/ORGAN SYSTEM SUPPORT IN SINGLE OR MULTIPLE ORGAN FAILURE
LEARNING OBJECTIVES – THE TRAINEE IS ABLE TO • *Prescribe drugs and therapies safely.* • *Manages antimicrobial therapy.* • *Administers blood and blood products safely.* • *Uses fluids and vasoactive/inotropic drugs to support the circulation.* • *Describes the use of devices to support the cardiopulmonary system.* • *Initiates, manages, and weans patients from invasive and non-invasive ventilatory support.* • *Recognises and manages electrolyte, glucose and acid-base disturbances.* • *Co-ordinates and provides nutritional assessment and support.*

KNOWLEDGE

- Clinical pharmacology:
    - Indications, contraindications, mode of action, pharmacodynamics, pharmacokinetics and interactions of commonly used drugs including:
        - hypnotics, sedatives and intravenous anaesthetic agents
        - simple & opioid analgesics; opioid antagonists
        - non-steroidal anti-inflammatory agents
        - neuromuscular blocking agents (depolarising & non-depolarising) & anti-cholinesterases
        - drugs acting on the autonomic nervous system (inotropes, vasodilators, vasoconstrictors, antiarrhythmics)
        - respiratory stimulants and bronchodilators
        - anti-hypertensives
        - anti-convulsants
        - anti-diabetic agents
        - diuretics
        - antibiotics (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)
        - corticosteroids and hormone preparations
        - drugs influencing gastric secretion & motility; antiemetic agents
        - local anaesthetic agents
        - immunosuppressants
        - antihistamines
        - antidepressants
        - anticoagulants
        - plasma volume expanders

  - Adverse effects and interactions of drugs and their management
  - Recognition and management of serious adverse reactions and anaphylaxis
  - Local policies and procedures governing the prescription of drugs and therapies
  - Indications for and basic interpretation of drug levels in blood or plasma
  - Impact of drug therapy on organ-system function
  - Effects of concomitant treatment and/or co-morbid conditions on an individual patient's response to treatment
- Clinical microbiology:
  - Epidemiology and prevention of infection in the ICU
  - Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation & infection
  - Risk factors for nosocomial infection and infection control measures to limit its occurrence
  - Local patterns of bacterial resistance and antibiotic policy
  - Indications, complications, interactions, selection, monitoring, and efficacy of common antimicrobial drugs (antibacterial, antifungal, antiviral, antiprotozoal, antihelmintics)
  - Requirements for microbiological surveillance and clinical sampling
  - Safe use of therapies which modify the inflammatory response
- Clinical biochemistry/fluid management:
  - Interpret data from an arterial blood gas sample
  - Physiology of fluid, electrolyte, acid-base and glucose control
  - Methods to assess and monitor intravascular volume and state of hydration using clinical signs and modern technology
  - Pathophysiological consequences, signs and symptoms of disordered fluid, electrolyte, acid-base and glucose balance
  - Treatment strategies for abnormalities of fluid, electrolyte, acid-base and glucose balance
  - Fluid therapies: components, physical properties, distribution and clearance of commonly used fluids; indications, contraindications and complications of their administration
  - Indications for and interpretation of fluid balance charts
  - Theoretical advantages and disadvantages of crystalloid and colloid solutions
- Clinical haematology
  - Indications for and basic interpretation of haematological tests (including coagulation and sickle tests)
  - Indications for and basic interpretation of blood grouping and x-matching

  - The pathogenesis and management of anaemia, thrombocytopenia, neutropenia and pancytopaenia Indications for, contraindication, risks and alternatives to blood transfusion
  - Local protocols which govern the ordering, storage & verification procedures, monitoring during administration of blood products and reporting of adverse incidents
  - Principles of blood and blood component therapy; principles of massive transfusion
  - Infections from contaminated blood / body fluids; strategy if contaminated (e.g. needle stick injury)
  - Coagulation and fibrinolytic pathways, and their associated disorders; clinical, laboratory and "near-patient" testing of haemostasis
  - Risk of bleeding: indications, contraindications, monitoring and complications of therapeutic anticoagulants, thrombolytic and anti-thrombolytic agents
  - Principles of plasma exchange

- Cardiovascular:
  - Pathophysiology, detection and management of shock states according to aetiology and in response to physiological data
  - Principles of haemodynamic monitoring - invasive & non-invasive methods, indications & limitations, physiological parameters and waveform interpretation
  - Invasive & non-invasive systems available for measuring cardiac output and derived haemodynamic variables, the principles involved and the type and site of placement of the monitoring device
  - Integration of data from clinical examination and haemodynamic monitoring to characterise haemodynamic derangements
  - Receptor-specific effects of inotropic and vasopressor agents; effects of critical illness and concomitant therapies on receptor function (e.g. down-regulation)
  - Indications and contraindications, limitations and complications of inotropic / vasoactive drug therapy
  - Interactions between inotropic agents and concomitant therapies and/or co-morbid diseases (e.g. ischaemic heart disease)
  - Pathophysiology and treatment of cardiac failure
  - Principles of right and left ventricular assist devices
  - Principles and techniques of cardiac pacing
  - Indications, contra-indications and basic principles of intra-aortic counter pulsations balloon pump

- Respiratory:
    - Causes of respiratory failure, their prevention and management
    - Principles of oxygen therapy and use of oxygen administration devices (including the risk of oxygen toxicity)
    - Signs and symptoms of acute airway insufficiency and acute respiratory failure, and indications for intervention
    - Distinguishing features of acute versus chronic respiratory failure and implications for management
    - Principles of emergency airway management
    - Indications for and methods of invasive and non-invasive mechanical ventilation
    - Principles of continuous positive airways pressure (CPAP) and positive end-expiratory pressure (PEEP) and CPAP & PEEP delivery systems
    - Principles of nitric oxide (NO) delivery and indications for use
    - Modes of mechanical ventilation - indications, contraindications & expected results of each mode (CMV, PRVC, HFOV, SIMV, PS, NAVA, CPAP, BiPAP, NIV)
    - Operation of at least one positive pressure ventilator, one non-invasive ventilator, and a constant positive airway pressure (CPAP) device
    - A systematic approach to checking ventilator, breathing circuit and monitoring devices
    - Initial set-up and modification of ventilator settings according to the condition or response of the patient
    - Principles of monitoring ventilation - significance of respiratory rate, tidal volume, minute volume, mean, peak, end expiratory and plateau pressure, intrinsic and extrinsic PEEP, inspired oxygen concentration, arterial blood gas and acid base status; relationship between mode of ventilation and choice of parameters monitored; airflow and airway pressure waveforms
    - Measurement and interpretation of pulmonary mechanics during mechanical ventilation
    - Potential adverse effects and complications of respiratory support and methods to minimise these
    - Ventilator associated pneumonia: definition, pathogenesis and prevention
    - Causes of lung injury in ventilated patients; effects and clinical manifestations of pulmonary barotrauma
    - Effect of ventilation upon cardiovascular and oxygen delivery parameters, other organ function and how these effects can be monitored (heart-lung interactions)
    - Principles of physiotherapy in the ICU
    - Principles of weaning from mechanical ventilation and factors which may inhibit weaning
    - Indications and contraindications to tracheostomy (surgical). Management of and complications associated with tracheostomy tubes Principles of extra-corporeal life support (ECLS)

- Renal:
    - Signs, symptoms and causes of renal failure (acute / chronic / acute on chronic) and indications for intervention
    - Investigation of impaired renal function
    - Distinguishing features of acute versus chronic renal failure and implications for management
    - Indications, complications and selection of renal replacement therapies (continuous and intermittent)
    - Placement & management of invasive devices necessary for renal replacement therapy (e.g. temporary haemodialysis catheter)
    - Principles of haemofiltration, haemodialysis, peritoneal dialysis, haemoperfusion and plasmapheresis
    - Function and operation of continuous haemodiafiltration devices (key components & trouble-shooting)
    - Effect of renal failure and its treatment on other organ systems
    - Nephrotoxic drugs and adjustment of drug doses in renal impairment/failure
    - Anticoagulation strategies during renal replacement therapy
- Gastrointestinal tract/Nutrition:
    - Patterns of nutritional impairment; consequences of starvation and malnutrition
    - Methods to assess nutritional status and basal energy expenditure
    - Fluid & caloric requirements in the critically ill patient including electrolytes, vitamins, trace elements and principles of immunonutrition
    - Indications, limitations, methods, and complications of enteral and parenteral nutritional techniques
    - Nutritional formulations: indications, complications and their management
    - Principles of nasogastric and nasojejunal cannulation in the intubated and non-intubated patient
    - Alternative routes for enteral feeding: indications, contraindications and complications of post-pyloric and percutaneous feeding tube placement
    - Prevention of stress ulceration
    - Gut motility: effects of drugs, therapy and disease
    - Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
    - Prevention and management of constipation and diarrhoea
    - Techniques for preventing gastrointestinal microbial translocation
    - Principles of blood glucose control: indications, methods, monitoring of safety & efficacy

- Miscellaneous:
    - Prophylactic therapies and indications for their use
    - Concept of risk: benefit ratio and cost effectiveness of therapies
    - Complications of specific therapies, their incidence and management
    - Circumstances when treatment is unnecessary
    - Effect of critical illness upon homeostatic mechanisms and causes of homeostatic disturbances

SKILLS

- Prioritise therapy according to the patient's needs
- Establish a management plan based on clinical and laboratory information
- Consider potential interactions when prescribing drugs & therapies
- Consider risk-benefit and cost-benefit of alternative drugs & therapies
- Obtain informed consent/assent from the patient where appropriate
- Critically appraise the evidence for and against specific therapeutic interventions or treatments
- Set realistic goals for therapy (independently or in collaboration with other teams)
- Define targets of therapy and review efficacy at regular intervals
- Consider modifying diagnosis and/or therapy if goals are not achieved
- Recognise when treatment is unnecessary or futile
- Administer intravenous drugs (prepare, select route and mode of administration and document)
- Use infusion pumps to administer drugs and fluids
- Prescribe appropriate antimicrobial therapy based on history, examination and preliminary investigations
- Collaborate with microbiologists / infectious diseases clinicians to link clinical, laboratory and local (hospital / regional / national) microbiological data
- Choose appropriate fluid, volume, rate and method of administration
- Administer and monitor response to repeated fluid challenges
- Consider and exclude unknown pathology if goals of fluid therapy are not achieved (e.g. continued bleeding)
- Select an appropriate inotrope / vasopressor - dose, physiological endpoint, rate and route of administration
- Order, check, verify and administer blood products according to local protocols
- Identify and correct haemostatic and coagulation disorders
- Resuscitate a patient with septic shock using appropriate monitoring, fluid therapy and vasoactive agents

- Measure and interpret haemodynamic variables (including derived variables)
- Identify and treat underlying causes for a metabolic acidosis
- Select the appropriate type and mode of ventilation for an individual patient
- Identify and correct ventilator misassembly and disconnections
- Stabilise a patient on a constant positive airway pressure (CPAP) device
- Stabilise a patient on a non-invasive ventilator (NIV)
- Stabilise a patient on a positive pressure ventilator
- Commence nitric oxide (NO) and determine effect, correct misassembly of NO connections
- Confirm adequate oxygenation and control of PaCO2 and pH
- Set and interpret data from ventilator alarms
- Construct, monitor and review a weaning plan
- Identify and avoid factors contributing to impaired renal function
- Supervise the provision of continuous renal replacement therapy
- Set appropriate exchange and fluid balances for renal replacement therapies
- Modify fluid and electrolyte therapy according to clinical features and fluid balance charts
- Prescribe and manage anticoagulation therapy
- Correct electrolyte disorders (e.g. hyperkalaemia, hyponatraemia)
- Prevent hypokalaemia
- Institute and manage a regimen to control blood glucose within safe limits
- Prescribe an appropriate standard enteral feeding regimen
- Identify surgical and other contraindications to enteral feeding
- Prescribe and supervise safe administration of a standard / customized parenteral (TPN) preparation
- Collaborate with nursing staff / clinical dietician in monitoring safe delivery of enteral and parenteral nutrition
- Liaise with clinical dieticians / medical team to plan feeding regimens after discharge from the ICU
- Recognise and manage emergencies; seek assistance appropriately
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METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
  - Consultant feedback in the workplace
  - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
  - Workplace-based assessments: DOPS; CbD; Mini-CEX
  - Entrustable professional activities: rated using workplace-based assessment tools
  - Logbook review with training supervisor
  - Clinical microbiology / infectious disease multidisciplinary ward rounds – mandatory
  - Trainee clinical and educational presentations
- Summative Assessment:
  - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
  - Logbook review with training supervisor
  - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Scholarship
- Professionalism
- Patient safety and quality of patient care

DOMAIN 5: SAFE USE OF PRACTICAL PROCEDURES

LEARNING OBJECTIVES – THE TRAINEE IS ABLE TO

- *Proficient in the use of different anaesthetic agents, sedatives, muscle relaxants and analgesia.*
- *Administers oxygen using a variety of administration devices.*
- *Safely gives general anaesthesia to Anaesthetic Assessment of Competence (ASA) 1-2 patients with spontaneous respirations for uncomplicated procedures in the supine position.*
- *Performs a rapid sequence induction for ASA1-2 patients and failed intubation.*
- *Monitors a child for level of anaesthesia and degree of muscle relaxation.*
- *Applies the principles and manages regional anaesthesia.*
- *Intubates with c-spine control.*
- *Manages the unanticipated difficult airway safely until help arrives.*
- *Safely employs sedation for procedures during which a child is stable and awake.*
- *Non – anaesthesia trainees complete basic anaesthesiology training - a minimum 6 months post in Anaesthesiology.*
- *Performs video-laryngoscopy.*
- *Performs endotracheal all suction.*
- *Performs BAL in the intubated patient.*
- *Performs thoracocentesis via a chest drain.*
- *Applies the principles of wide-bore vascular access for rapid fluid resuscitation.*
- *Performs peripheral venous catheterisation.*
- *Performs central venous catheterisation.*
- *Performs vascath insertion.*
- *Performs arterial catheterisation*
- *Applies the principles of cardiac monitoring.*
- *Describes how to perform pericardiocentesis.*
- *Describes a method for measuring cardiac output and derived haemodynamic variables.*
- *Performs lumbar puncture.*
- *Manages the administration of analgesia via an epidural catheter.*
- *Performs nasogastric and nasojejunal tube placement.*

- *Describes how to perform abdominal paracentesis.*
- *Describes and or performs Sengstaken tube (or equivalent) placement.*
- *Describes indications for, and safe conduct of gastroscopy.*
- *Performs urinary catheterisation.*

KNOWLEDGE

- Respiratory
- Anatomy and bronchoscopic appearance of the upper and lower airways
- Methods of maintaining a clear airway
- Indications, selection and insertion of oral (guedel) airways, nasopharyngeal airways and laryngeal mask airways (LMA)
- Tracheal intubation: selection of tube type, diameter & length; indications and techniques; methods to confirm correct placement of a tracheal tube
- Appropriate use of drugs to facilitate airway control
- Monitoring during sedation/induction of anaesthesia for endotracheal intubation
- Airway management in special circumstances, (head injury, full stomach, upper airway obstruction, shock, cervical spine injury)
- Causes of regurgitation and vomiting; prevention and management of pulmonary aspiration
- Cricoid pressure: indications and safe provision
- Management of difficult intubation and failed intubation (local algorithm or protocol)
- Indications for and principles of fibreoptic intubation; use of fibreoptic intubation with airway adjuncts
- Indications and methods of securing an emergency surgical airway
- Anatomical landmarks for cricothyroidotomy/tracheostomy/mini-tracheotomy
- Indications and techniques for needle and surgical cricothyroidotomy
- Indications and contraindications to tracheostomy
- Manage anaesthesia and control the airway during initial tracheostomy tube insertion in the intensive care unit (ICU)
- Management of and complications associated with tracheostomy tubes
- Principles of endotracheal suctioning, including consequences of the procedure during ventilation
- Environmental hazards associated with storage and use of oxygen; strategies to promote safety
- Use of pipeline gas and suction systems
- Storage and use of oxygen, nitric oxide (NO), compressed air and helium, including use of gas cylinders

- Principles of pressure regulators, flow meters, vaporizers and breathing systems
- Indications for and operation of fixed and variable performance oxygen therapy equipment, humidification and nebulising devices
- Indications and complications of hyperbaric oxygenation
- Methods of bronchoscopy via an endotracheal tube
- Methods of broncho-alveolar lavage (BAL) in an intubated patient
- Safety and maintenance of flexible fibreoptic endoscopes
- Detection and management of haemo/pneumothorax (simple and tension)
- Anatomical landmarks for intrapleural drains
- Insertion and management of chest drains and air exclusion devices, including patients requiring CT- or ultrasound-guided chest drain insertion

- Cardiovascular:
  - Surface anatomy: structures in the antecubital fossa; large veins and anterior triangle of the neck; large veins of the leg and femoral triangle; arteries of the arms and legs
  - Methods for securing vascular access rapidly
  - Principles, routes and techniques of peripheral and central venous cannulation
  - Principles and techniques for surgical isolation of a vein or artery
  - Methods for insertion of a tunnelled central venous catheter (e.g. for parenteral nutrition)
  - Indications, contraindications, and complications of peripheral intravenous infusion / injection and central venous infusion / injection
  - Principles of arterial catheterisation
  - Allens test - application & limitations
  - Recognition and management of inadvertent intra-arterial injection of harmful substances
  - Principles of haemodynamic monitoring - invasive & non-invasive methods, indications & limitations, physiological parameters and waveform interpretation
  - Zero and calibration techniques for invasive pressure monitoring
  - Invasive & non-invasive systems available for measuring cardiac output and derived haemodynamic variables, the principles involved and the type and site of placement of the monitoring device
  - Interpretation of, relationships between, sources of error and limitations of measured and derived cardiovascular variables including pressure, flow, volume and gas transport
  - Principles of ECG monitoring (heart rate, rhythm, conduction, ST segment change & QT interval) - indications, limitations and techniques. Advantages and disadvantages of different lead configurations
  - Basic and complex cardiac arrhythmias - recognition and management (pharmacological and electrical)
  - Principles and techniques of cardiac pacing
  - Treatment (algorithm) of patients in ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)

  - Defibrillation: principles of monophasic & biphasic defibrillators; mechanism, indications, complications, modes and methods (manual and automated external defibrillators (AED))
  - Basic principles of ultrasound and the Doppler effect
  - Principles and basic interpretation of echocardiography
  - Detection and acute management of cardiac tamponade
  - Anatomical landmarks and technique for percutaneous pericardial aspiration
- Neurology:
  - Physiological effects of pain and anxiety
  - Recognition and methods of assessment of pain
  - Pharmakokinetics, pharmacodynamics, indications and complications of opiates and local anaesthetic agents
  - Indications, contraindications, methods and complications of epidural catheterisation
  - Indications, contraindications and complications of epidural infusion / injection; principles of safe epidural drug administration
  - Contraindications, methods and complications of epidural catheter removal
  - Indications for lumbar puncture and CSF sampling; laboratory analysis of CSF samples
  - Interpret 4 channel bedside EEG (CFAM – cerebral function analysing monitor)
- Gastrointestinal system
  - Principles of nasogastric and nasojejunal cannulation in the intubated and non-intubated patient
  - Principles and techniques for insertion of gastro-oesophageal balloon tamponade tube (e.g. Sengstaken-Blakemore)
  - Anatomy of the abdominal wall; landmarks for abdominal paracentesis and abdominal drainage catheters
  - Principles of peritoneal lavage
  - Indications, contraindications, complications and technique of abdominal paracentesis
  - Alternative routes for enteral feeding: indications, contraindications and complications of post-pyloric and percutaneous feeding tube placement
- Miscellaneous:
  - Patient selection - indications, contraindications and potential complications of the procedure / intervention
  - Universal precautions and preventative infection control techniques (hand washing, gloves, protective clothing, sharps disposal etc.)
  - Principles of aseptic technique and aseptic handling of invasive medical devices
  - Methods and routes of insertion - associated indications and complications

- Appropriate use of drugs to facilitate the procedure
- Detection of potential physiological alterations during the procedure
- Indications for specific monitoring to ensure patient safety during an intervention / procedure
- Complications of the technique, how to prevent/recognise them and initiate appropriate treatment
- Methods of sterilisation and cleaning or disposal of equipment
- Management and use of the device once in situ necessary to minimise the risks of complications
- Indications and technique for removal

SKILLS

- GENERIC
- Respiratory:
  - Accurately assess the airway for potential difficulties with airway management
  - Choose a safe environment to undertake airway management (or optimise environment as circumstances allow)
  - Optimise the patient's position for airway management
  - Maintain a clear airway using oral / nasal airways
  - Support ventilation using bag and mask
  - Insert and check correct placement of laryngeal mask airway
  - Select appropriate tracheal tube type, size and length
  - Perform intubation and verify correct placement of tube
  - Manage and minimise cardiovascular and respiratory changes during and after intubation
  - Apply an end-tidal CO2 detector post-intubation and interpret a capnograph trace
  - Demonstrate rapid sequence induction of anaesthesia / cricoid pressure
  - Change an oro- and naso-tracheal tube
  - Perform extubation
  - Prepare equipment for difficult or failed intubation
  - Demonstrate failed intubation drill (according to local algorithm or protocol)
  - Describe minitracheotomy or needle cricothyroidotomy
  - Change a tracheostomy tube electively
  - Identify patients requiring tracheostomy; discuss indications and contraindications for surgical tracheostomy
  - Perform endotracheal suction (via oral / nasal / tracheostomy tube)

- Check pipelines; check and change portable cylinders
- Undertake bronchoscopy to assess tube position
- Undertake bronchoscopy to perform bronchoalveolar lavage
- Demonstrate aseptic insertion of an intrapleural chest drain and connection to a one-way seal device
- Demonstrate emergency relief of tension pneumothorax

- Cardiovascular:
  - Insert peripheral cannulae via different routes
  - Establish peripheral venous access appropriate for resuscitation in major haemorrhage
  - Chest x-ray interpretation
  - Insert central venous catheters by different routes
  - Describe a method for tunnelled intravenous catheterisation
  - Minimise blood loss related to clinical investigations and procedures
  - Insert arterial catheters by different routes
  - Distinguish between arterial and venous blood samples
  - Prepare equipment for intravascular pressure monitoring
  - Measure and interpret haemodynamic variables (including derived variables)
  - Obtain and interpret data from central venous catheters
  - Obtain and interpret data from a pulmonary artery catheter, oesophageal Doppler or alternative cardiac output measurement technique
  - Obtain and interpret data from ECG (3- and 12-lead)
  - Insert a temporary pacing wire
  - Demonstrate emergency percutaneous pericardial aspiration
  - Establish & review pacing box settings
  - Use manual external defibrillators
  - Use automated external defibrillators (AED)
- Neurology:
  - Select an appropriate epidural infusion regimen and titrate safely
  - Select & determine adequacy and route of administration of analgesia
  - Manage an established epidural infusion

- Administer bolus analgesia via an epidural catheter
- Minimise complications associated with opioid and non-opioid analgesics

- Gastrointestinal system:
  - Insert a nasogastric tube in an intubated and non-intubated patient
  - Insert a nasojejunal tube in an intubated and non-intubated patient
  - Insert an abdominal drain
- Miscellaneous:
  - Prioritise tasks and procedures
  - Select appropriate equipment or device & use resources efficiently
  - Prepare equipment, patient and staff prior to undertaking the procedure
  - Obtain informed consent/assent from the patient where appropriate
  - Use drugs as indicated to facilitate the procedure
  - Choose an appropriate route / method of insertion and position the patient accordingly
  - Identify relevant anatomical landmarks
  - Use protective clothing (gloves / mask / gown / drapes) as indicated
  - Perform the procedure in a manner which minimises the risks of complications
  - Undertake appropriate investigation to confirm correct placement of device or exclude complications
  - Sterilise, clean or dispose of equipment appropriately
  - Recognise and manage emergencies; seek assistance appropriately

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
  - Consultant feedback in the workplace
  - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
  - Workplace-based assessments: DOPS
  - Entrustable professional activities: rated using DOPS
  - Logbook review with training supervisor
  - Difficult airway workshop (College of Anaesthetists) - desirable

- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor: record of procedures performed
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Scholarship
- Patient safety and quality of patient care

DOMAIN 6: PERI-OPERATIVE CARE

LEARNING OBJECTIVES – THE TRAINEE IS ABLE TO

- *Manages the pre- and post-operative care of the high risk surgical patient.*
- *Manages the care of the patient following cardiac surgery.*
- *Manages the care of the patient following craniotomy.*
- *Manages the care of the patient following solid organ transplantation.*
- *Manages the pre and post-operative care of the trauma patient.*

KNOWLEDGE

- Assessment and management of commonly encountered perioperative conditions & complications including:
  - Respiratory:
    - Interpretation of symptoms and signs of respiratory insufficiency in the surgical patient
    - Airway issues: the unprotected airway; upper and lower airway obstruction including laryngeal trauma & oedema
    - Pulmonary infiltrates: pneumonia, atelectasis, pulmonary infiltrates, paediatric acute respiratory distress syndrome (pARDS) and their causative factors; pulmonary oedema
    - Pleural disease: pleural effusion, haemo/pneumothorax (simple and tension); use of chest drains
    - Specific issues following thoracotomy, lung resection, oesophagectomy, cardiac surgery and thymectomy.
  - Cardiovascular
    - Interpretation of symptoms and signs of cardiovascular insufficiency in the surgical patient
    - Operative risk factors in patients with ischaemic heart disease;
    - Recognition and management of post-operative bleeding
    - Management of hypotension: pulmonary embolus; cardiac tamponade; hypovolaemic shock, myocardial infarction
    - Recognition and management of hypertension
    - Surgery for acquired and congenital cardiac disease
    - Specific issues following cardiac surgery (coronary grafting, valve replacement), aortic surgery (arch, thoracic, abdominal), and heart and heart-lung transplantation

- Renal:
  - Causes of perioperative oliguria and anuria
  - Prevention and management of acute renal failure
  - Specific issues following nephrectomy, ileal conduit formation, and renal transplantation

- Neurological:
  - Interpretation of symptoms and signs of neurological insufficiency in the surgical patient
  - Causes of post-operative confusion: delirium, stroke, drug effect, raised intracranial pressure; sepsis
  - Peri-operative management of patients with neuropathies and myopathies
  - Specific issues following neurosurgery: intracranial pressure monitoring; prevention of secondary brain injury, intracerebral haemorrhage; spinal cord injury & ischaemia
- Gastrointestinal:
  - Interpretation of abdominal symptoms and signs in the surgical patients: abdominal pain and distension; diarrhoea and vomiting; persistent ileus; jaundice; surgical drain losses
  - Management of patients with acute necrotic pancreatitis
    Recognition and management of abdominal hypertension and abdominal compartment syndrome
  - Peri-operative nutrition
  - Management of the pre- and post-liver transplant patient
  - Specific issues following surgery for necrotising entercolitis, tracheooesphageal fistula and congenital diaphragmatic hernia
  - Specific issues following surgery for peptic ulceration/upper GI haemorrhage, intestinal ischaemia and perforation

- Haematology/Oncology:
  - Care of the immunosuppressed patient
  - Complications of chemotherapy
  - Management of acute haemorrhage and blood transfusion in the setting of coagulation disorders, haemoglobinopathies and for patients on therapeutic anticoagulation.
- Metabolic/Endocrine:
  - Peri-operative management of patients with diabetes including peri-operative diabetic emergencies
  - Peri-operative management of patients with adrenocortical or thyroid disorders
  - Specific issues following surgery of the thyroid, adrenal and pituitary glands
  - Peri-operative management of electrolyte disorders.
- Sepsis and infection:
  - Peri-operative infection risk and prophylactic antibiotics
  - Opportunistic and nosocomial infection including surgical site infection, respiratory infection, necrotizing fasciitis, peritonitis and peritoneal collections
- Musculoskeletal:
  - Specific issues following surgery with external fixators, casts, pressure area care and salvage procedures
- Solid organ transplantation (Heart, Lung, Liver, Renal)
  - Peri-operative considerations, pharmacological management, post-operative care and potential complications
  - Immunosuppression and rejection

- Miscellaneous:
  - Recognition, assessment and management of acute pain
  - Indications and choice of agent for antibiotic prophylaxis
  - Indications for and methods of perioperative anti-thrombotic treatment
  - Factors determining perioperative risk
  - Methods of optimising high risk surgical patients
  - Importance of preoperative health status on postoperative outcomes

- Indications for, and interpretation of pre-operative investigations
- Dangers of emergency anaesthesia & surgery
- Effect of gastric contents and dehydration on perioperative risk
- Anaesthetic risk factors complicating recovery: suxamethonium apnoea; anaphylaxis; malignant hyperpyrexia; difficult airway
- Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
- Perioperative implications of current drug therapy
- Consent and assent in the competent and non-competent patient
- Implications for postoperative care of common acute and chronic medical conditions
- Implications of type of anaesthesia (general/regional/local) for perioperative care
- Implications of type / site of surgery for postoperative management and potential complications within the first 24 hours of surgery

SKILLS

- Optimise high-risk surgical patients before surgery: consider site of care and management plan
- Communicate the risk of surgery to patients and family
- Consider the impact of long-term and chronic treatment on acute surgical care
- Accurately assess the airway for potential difficulties with airway management
- Ensure the necessary resources are available for safe post-operative care
- Identify pre-operative health status and intercurrent disease, medications, allergies and their interaction with the nature of anaesthetic and surgery
- Obtain relevant information from the patient, relatives and other secondary sources
- Interpret pre-operative investigations, intra-operative findings and events/complications, and respond to them appropriately
- Assess conscious level and conduct a careful systems review
- Select & determine adequacy and route of administration of analgesia
- Document, monitor and manage fluid balance, circulating volume, drains, systemic oxygen supply
- Establish a plan for postoperative management

- Recognise and manage perioperative emergencies and seek assistance appropriately
- Identify life-threatening cardiorespiratory complications; manage hypovolaemia and impaired oxygen delivery
- Manage post-operative hypo and hypertension
- Differentiate and manage tension pneumothorax, cardiac tamponade & pulmonary embolus
- Manage post-operative stridor
- Review and monitor perioperative immunosuppressive therapy
- Monitor and manipulate cerebral perfusion pressure (CPP)
- Describe the risk period for use of depolarizing neuromuscular blocking agents in patients undergoing repeated surgical procedures
- Lead, delegate and supervise others appropriately according to experience and role

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: Mini-CEX, CbD
    - Entrustable professional activities: rated using Mini-CEX and CbD
    - Logbook review with training supervisor
    - Trainee educational and clinical presentations
- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor: case mix of managed patients
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Communication and interpersonal skills
- Collaboration and teamwork
- Scholarship
- Patient safety and quality of patient care

DOMAIN 7: COMFORT AND RECOVERY

LEARNING OBJECTIVES – TRAINEE IS ABLE TO

- *Identifies and attempts to minimise the physical and psychosocial consequences of critical illness for patients and family.*
- *Manages the assessment, prevention and treatment of pain and delirium.*
- *Manages sedation and neuromuscular blockade.*
- *Communicates the continuing care requirements of patients at PCCU discharge to healthcare professionals and families.*
- *Manages the safe and timely discharge of patients from PCCU.*

KNOWLEDGE

- Pain and anxiety
    - Causes of and methods of minimising distress in patients
    - Physiological effects of pain and anxiety
    - Recognition and methods of assessment of pain
    - Recognition and assessment of anxiety
    - Pharmakokinetics, pharmacodynamics, indications and complications of commonly used analgesic, hypnotic, and neuromuscular blocking drugs in patients with normal and abnormal organ system function
    - Principles of acute pain management
    - Patient-controlled analgesia
    - Indications, contra-indications, methods and complications of regional analgesia in critical illness

- Recognition of and the aetiology of neuropsychiatric and social complications of critical illness
    - Neuropsychiatric complications (depression, anxiety, post-traumatic stress disorders)
    - Adverse effects on socialisation and employment
    - Drug-related (e.g. hallucinations, drug withdrawal, delirium)
    - Sensory deprivation / sensory overload
    - Sleep deprivation and its consequences
    - Environmental factors (light, noise, pain, staff-patient interactions)
- Allied health issues
    - Methods of communicating with patients who are unable to speak
    - Principles of rehabilitation: physical and psychological
    - Supportive services integral to the long term rehabilitation of critically ill patients (physiotherapy, occupational therapy, speech and language therapy, orthotics, social services)
- Miscellaneous:
    - Consequences of immobilisation and mobilisation techniques (including disuse atrophy, foot-drop, ectopic calcification)
    - Causes, prevention and management of critical illness polyneuropathy, motor neuropathy, and myopathy
    - Principles of managing usual care to pressure areas, skin, mouth, eyes and bowels in critically ill patients
    - Resources available to patients and relatives for education and support (e.g. societies, local groups, publications, referral to allied health care professionals)
    - Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
    - Potential psychological impact of inter-hospital transfer and family dislocation
    - Common risk factors for post-ICU mortality or re-admission and their minimisation
    - Methods for assessing or measuring quality of life
    - Management of tracheostomy care and avoidance of complications outside the ICU
    - Facilitating patient speech when a tracheostomy is in situ
    - Long-term ventilation outside the ICU environment (e.g. home ventilation)
    - Persistent vegetative state
    - The role of patient's relatives and their contribution to care
    - Methods of measuring depth of sedation; effects of over-sedation and strategies to avoid this

SKILLS

- Identify complications associated with critical illness
- Work with colleagues and relatives to minimise patient distress
- Anticipate the development of pain and/or anxiety and adopt strategies for its prevention or minimisation
- Interpret data from scoring or scaling systems to assess pain and sedation
- Use analgesic, hypnotic and neuromuscular blocking drugs appropriately and safely
- Select & determine adequacy and route of administration of analgesia
- Minimise complications associated with opioid and non-opioid analgesics
- Obtain and interpret data from a nerve stimulator to monitor the degree of neuromuscular blockade
- Propose and implement a plan to provide adequate sleep and rest in ICU patients
- Communicate effectively with families who may be anxious, angry, confused, or litigious
- Participate in the education of patients/families
- Appropriate and timely referral to specialists / allied health professionals
- Identify discharge criteria for individual patients
- Ensure effective information exchange before patient discharge from ICU
- Take decisions to admit, discharge or transfer patients
- Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge
- Change a tracheostomy tube electively
- Follow-up patients after discharge to the ward
- Participate in follow-up clinics / services where available
- Lead, delegate and supervise others appropriately according to experience and role

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants

within the ICU)
    - Workplace-based assessments: Mini-CEX, CbD
    - Entrustable professional activities: rated using Mini-CEX and CbD
    - Logbook review with training supervisor
    - Trainee educational and clinical presentations
    - Trainee participation in ICU Multidisciplinary rounds with physiotherapy, occupational therapy and speech therapy services
    - Medical Council Guide to Professional Conduct and Ethics
- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor: case mix of managed patients

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Professionalism
- Communication and interpersonal skills
- Collaboration and teamwork
- Management (including self-management)
- Scholarship
- Patient safety and quality of patient care

DOMAIN 8: END OF LIFE CARE

LEARNING OBJECTIVES – TRAINEE IS ABLE TO

- *Considers and uses support mechanisms for difficult end-of-life decisions in critically ill children (e.g. ethics, second opinions, mediation and the law).*
- *Institutes a holistic approach to planning for children with life-limiting illness.*
- *Manages the different cultural and religious influences on the dying child and their family.*
- *Manages the process of withholding or withdrawing of ICU support in a child.*
- *Assesses brain stem function, understanding the legal constraints.*
- *Facilitates organ donation as a part of end-of-life care (i.e. referral to donation services) and manages donation after brain and circulatory death.*
- *Supports a family during the death of their child and through bereavement.*
- *Manages the gathering of pre- and post-mortem specimens for diagnosis.*

KNOWLEDGE

- Basic ethical principles: autonomy, beneficence, non-maleficence, justice
- Ethical and legal issues in decision-making for the incompetent patient
- Difference between euthanasia and allowing death to occur: principle of double effect
- Withholding and withdrawing treatment: omission and commission
- The limitations of intensive care medicine - expectations of what can and cannot be achieved
- Decision-making processes for withholding and withdrawing life sustaining therapies including documentation and iterative review
- Principles of delivering bad news to patients and families
- Availability and access to local support for dying patients and their families
- Bereavement: anticipating and responding to grief
- Cultural and religious practices of relevance when caring for dying patients and their families
- Principles of pain and symptom management
- Procedure for withdrawing treatment and support
- Causes and prognosis of vegetative states
- Causes of brainstem death
- Applied anatomy and physiology of the brain and nervous system including cerebral blood supply, base of skull, autonomic nervous system and cranial nerves
- Physiological changes associated with brainstem death
- Preconditions and exclusions for the diagnosis of brainstem death
- Clinical, imaging and electrophysiologic tests to diagnose brain death
- Legal aspects of brainstem death diagnosis
- Cultural and religious factors which may influence attitude to brainstem death and organ donation
- Principles of management of the organ donor (according to national / local policy)
- Common investigations and procedures undertaken in the ICU prior to organ harvesting
- Role of national organ/tissue procurement authority and procedures for referral
- Responsibilities and activities of transplant coordinators
- Responsibilities in relation to legal authorities for certifying death (e.g. coroner, procurator fiscal or equivalent), and reasons for referral

- The value of autopsy (post-mortem) examination.
- Procedure for completion of death certification

SKILLS

- Recognise when treatment is unnecessary or futile
- Discuss end of life decisions with members of the health care team
- Ability and willingness to communicate and discuss issues pertaining to end of life with patients and relatives
- Differentiate competent from incompetent statements by patients
- Discuss treatment options with a patient or relatives before ICU admission
- Participate in timely discussion and regular review of 'do not resuscitate' orders and treatment limitation decisions
- Participate in discussions with relatives about treatment limitation or withdrawal
- Communicate effectively with relatives who may be anxious, angry, confused, or litigious
- Lead a discussion about end of life goals, preferences and decisions with a patient and/or their relatives
- Explain the concept of brainstem death and organ donation clearly
- Obtain consent/assent for treatment, research, autopsy or organ donation
- Withdraw life sustaining treatment or organ support
- Relieve distress in the dying patient
- Document pre-conditions and exclusions to brainstem death testing
- Perform and document tests of brainstem function to confirm a diagnosis of brainstem death
- Consult and confirm findings of brainstem function tests with colleagues as required by local / national policy or as indicated
- Liaise with local transplant coordinators to plan management of the organ donor
- Recognise and rapidly respond to adverse trends in monitored parameters

- Aware of the emotional needs of self and others; seeks and offers support appropriately
- Establishes trusting relationships with and demonstrates compassionate care of patients and their relatives
- Integrity, honesty & respect for the truth underpin relationships with patients, relatives and colleagues
- Appreciates that the decision to withhold or withdraw treatment does not imply the termination of care
- Consult and take into account the views of referring clinicians; promote their participation in decision-making where appropriate

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: Mini-CEX, CbD, both focused on end-of-life care and on relevant discussion with patients and/or families
    - Entrustable professional activities: rated using Mini-CEX and CbD
    - Logbook review with training supervisor
    - Irish Donor Awareness Programme course (JFICMI) – mandatory
    - Intensive Care Simulation course (JFICMI) – desirable
    - Guidelines on Brainstem Death and Management of the Organ Donor (Intensive Care Society of Ireland)
    - Medical Council Guide to Professional Conduct and Ethics
- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Scholarship
- Communication and interpersonal skills
- Professionalism
- Patient safety and quality of patient care

DOMAIN 9: ADULT CARE

LEARNING OBJECTIVES – TRAINEE IS ABLE TO

- *Describe the recognition of the acutely ill child and the initial management of adult emergencies including transfer of the critically ill adult.*

KNOWLEDGE

- Major anatomical and physiological differences between adults and children
- Pathophysiology and principles of management of disorders which are life-threatening to adult patients including:
    - acute respiratory failure (including COPD, acute severe asthma, pneumonia, pulmonary embolus, pneumothorax)
    - myocardial infarction
    - cardiac failure
    - polytrauma
    - severe infections including meningitis
    - intoxications
    - metabolic disorders
    - neurological emergencies including CVA, subarachnoid haemorrhage, seizures
    - endocrine emergenices
- Adult resuscitation, in particular the differences between adult and paediatric resuscitation
- Principles of adult airway management: methods & techniques; tube sizes; selection of masks and airways
- Principles of mechanical ventilation in an adult
- Preparation for and methods of securing venous access
- Intraosseous cannulation
- Volume status
- Adult dosing of common emergency drugs
- General principles for stabilising the critically ill or injured adult until senior assistance arrives
- Operation of local adult referral /retrieval services
- Principles of communication
- Impact of occupational and environmental exposure, socio-economic factors and life style factors on critical illness

SKILLS

- Adult resuscitation at advanced life support level (ACLS or equivalent)
- Prepare equipment & drugs for adult intubation
- Demonstrate adult tracheal intubation
- Secure venous access
- Manage mechanical ventilation in a critically ill adult
- Communicate effectively with, and attempt to reassure patient and family
- Recognise and manage adult emergencies until senior, specialist assistance arrives
- Manage and stabilise the injured adult until senior assistance arrives

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: DOPS, Mini-CEX, CbD
    - Entrustable professional activities: rated using WBAs
    - Logbook review with training supervisor
    - ACLS or equivalent – desirable
    - Adult Medicine Transport Course – desirable

- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
      Logbook review with training supervisor

- Workplace-based assessments: DOPS, Mini-CEX, CbD
- Entrustable professional activities: rated using WBAs
- Logbook review with training supervisor
- ACLS or equivalent – desirable
- Adult Medicine Transport Course - desirable

- Summative Assessment:
  - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
  - Logbook review with training supervisor

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Scholarship
- Communication and interpersonal skills
- Professionalism
- Patient safety and quality of patient care

DOMAIN 10: TRANSPORT

LEARNING OBJECTIVE – TRAINEE IS ABLE TO

- *Transfers a critically ill child safely within and between hospitals.*
- *Stabilises and appropriately transfers a child with poly trauma.*
- *Responds to changes in vital physiological functions during transfer.*
- *Stabilises all major injuries prior to transfer, troubleshoots transfer equipment failure.*
- *Recognises and minimises transport risks.*

KNOWLEDGE

- Indications, risks and benefits of patient transfer (intra- / inter-hospital)
- Criteria for admission to, and discharge from ICU - factors influencing intensity and site of care (ward, high dependency unit (HDU), intensive care unit (ICU))
- Principles of patient safety before, during and after episode of transfer
- Strategies to manage the unique problems associated with patient transfer - limitations of space, personnel, monitoring & equipment
- Advantages and disadvantages of road ambulance, fixed and rotary wing aircraft including problems associated with altitude, noise, lighting conditions, vibration, acceleration and deceleration
- Selection of mode of transport based upon clinical requirements, distance, vehicle availability and environmental conditions
- Determination of required number of physicians / nurses / others during transfer and the role of paramedical personnel
- Selection and operation of transport equipment: size, weight, portability, power supply/battery life, oxygen availability, durability and performance under conditions of transport
- Principles of monitoring under transport conditions
- Physiology associated with air transport
- Homeostatic interaction between patient and environment (e.g. thermoregulation, posture / positioning)
- Communication prior to and during transport
- Operation of locally available retrieval services
- Potential psychological impact of inter-hospital transfer and family dislocation

SKILLS

- Determine when the patient's needs exceed local resources or specialist expertise (requirement for transfer)
- Take decisions to admit, discharge or transfer patients
- Communicate with referring and receiving institutions and teams
- Check transfer equipment and plan transfers with personnel prior to departure
- Select appropriate staff based upon patient need
- Prepare patients prior to transfer; anticipate and prevent complications during transfer - maintain patient safety at all times
- Adapt and apply general retrieval principles where appropriate to pre-, intra-, and inter-hospital transportation
- Consider the need for stabilisation before transfer
- Undertake intra-hospital transfer of ventilated patients to theatre or for diagnostic procedures (e.g. CT, MRI, Interventional radiology)
- Undertake inter-hospital transfers of patients with single or multiple organ failure
- Maintain comprehensive documentation of the patient's clinical condition before, during and after transport including relevant medical conditions, therapy delivered, environmental factors and logistical difficulties encountered
- Lead, delegate and supervise others appropriately according to experience and role

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: CbD
    - Entrustable professional activities: rated using CbD
    - Logbook review with training supervisor
    - IPATS - Paediatric Critical Care Retrieval Course – mandatory
- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor: record of intra- and inter-hospital transfers
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Scholarship
- Collaboration and teamwork
- Communication and interpersonal skills
- Patient safety and quality of patient care

DOMAIN 11: PATIENT SAFETY AND HEALTH SYSTEMS MANAGEMENT

LEARNING OBJECTIVES – TRAINEE IS ABLE TO

- *Engages with the multiple disciplinary team involved with clinical patient management and prioritises management goals for each patient.*
- *Complies with infection control measures.*
- *Identifies environmental hazards and promotes safety for patients and staff.*
- *Identifies and minimises risk of critical incidents and adverse events, including complications of critical illness.*
- *Critically appraises and applies guidelines, protocols and care bundles.*
- *Engages in and applies audit, quality improvement(QI) projects and research within the intensive care.*
- *Co-ordinates and leads care of the long-term/recurrent attender with multiple needs.*
- *Assists, troubleshoots and initialises long-term term ventilation management where appropriate.*

KNOWLEDGE

- Clinical issues
    - Recognition of patient groups at high risk for developing complications
    - Pathogenesis, risk factors, prevention, diagnosis and treatment of complications of ICU management including:
        - Nosocomial infection
            - Epidemiology and prevention of infection in the ICU
            - Types of organisms - emergence of resistant strains, mode of transfer, opportunistic and nosocomial infections; difference between contamination, colonisation & infection
            - Risk of colonisation with potentially pathogenic micro-organisms and the factors associated with patient,
            - staff, equipment and environmental colonisation
            - Autogenous infection: routes and methods of prevention
            - Cross infection: modes of transfer and common agents
            - Universal precautions and preventative infection control techniques (hand washing, gloves, protective
            - clothing, sharps disposal etc.)
            - Requirements for microbiological surveillance and clinical sampling
            - Local patterns of bacterial resistance and antibiotic policy
            - Benefits and risks of different prophylactic antibiotic regimens
            - Principles of aseptic technique and aseptic handling of invasive medical devices
            - Methods of sterilisation and cleaning or disposal of equipment
            - Infections from contaminated blood / body fluids; strategy if contaminated (e.g. needle stick injury)
            - Ventilator associated pneumonia (VAP)
        - Ventilator associated lung injury (pulmonary barotrauma, pulmonary oxygen toxicity)
        - Thromboembolism (venous, arterial, pulmonary, intracardiac)
        - Stress ulceration
        - Pain
        - Malnutrition
        - Critical illness polyneuropathy, motor neuropathy & myopathy
        - Haemorrhage

- Issues related to infrastructure:
    - Principles of local / national health care provision; strategic planning of the ICU service (structure, function, financing) within the wider health care environment
    - Physical requirements of ICU design
    - Equipment requirements and selection: clinical need & priority; accuracy, reliability, safety and practical issues (ease of use, acceptance by Staff)
    - Local process for ordering consumables and maintaining equipment
    - Difference between absolute requirement and possible benefit when applying expensive technology to critically ill patients
    - Factors that determine the optimum staff establishment for specialist and junior medical staff, nurses and allied professional and non-clinical ICU staff
- Issues related to process of care:
    - Methods of effective communication of information (written; verbal etc)
    - Triage and management of competing priorities
    - Principles of crisis management, conflict resolution, negotiation and debriefing
    - Roles of different members of the multidisciplinary team and local referral practices
    - Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management
    - Local policies and procedures relevant to practice
    - Treatment algorithms for common medical emergencies
    - Published standards of care at local, national and international level (including consensus statements and care bundles)

- Issues related to quality assurance
    - Purpose and methods of clinical audit (e.g. mortality reviews, complication rates)
    - Recent advances in medical research relevant to intensive care
    - Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision & economic analyses)
    - Electronic methods of accessing medical literature
    - Identification and critical appraisal of literature; integration of findings into local clinical practice
    - Principles of applied research and epidemiology necessary to evaluate new guidelines / forms of therapy
    - Critical incident or error monitoring
- Miscellaneous:
    - Principles of risk prevention
    - Common sources of error and factors which contribute to critical incidents / adverse events (ICU environment, personnel, equipment, therapy and patient factors)
    - Staff safety: susceptibility to harmful physical, chemical and infectious hazards in the ICU
    - Environmental control of temperature, humidity, air changes and scavenging systems for waste gases and vapours
    - Measurement of gas and vapour concentrations, (oxygen, carbon dioxide, nitric oxide, and volatile anaesthetic agents) - environmental safety
    - Hazards associated with ionising radiation and methods to limit these in the ICU
    - Electrical safety: conditions which predispose to the occurrence of macro-shock / micro-shock; physical dangers of electrical currents; relevant standards regarding safe use of electricity in patient care; basic methods to reduce electrical hazards.
    - Confidentiality and data protection - legal and ethical issues
    - Professional responsibility and duty of care to patients placed at risk by the actions of fellow clinicians
    - Plan of action / local procedures to be followed when a health care worker is noticed to be in distress, whether or not patients are considered to be at risk
    - Principles of outcome prediction / prognostic indicators and treatment intensity scales; limitations of scoring systems

in predicting individual patient outcome
- Process and outcome measurement
- Principles of general and organ-specific scoring systems and their usefulness in assessing likely outcome of an illness (e.g. paediatric index of mortality)
- Influence of injury or illness being considered on the validity of a scoring system as a predictor of likely outcome (e.g. Glasgow Coma Score (GCS) in head injury versus drug overdose)
- One general method for measuring severity of illness
- Principles of case mix adjustment
- Principles of care legislation applicable to PCCM practice
- The non-clinical role of the ICU specialist and how these activities contribute to the efficacy of the ICU, the profile of the ICU within the hospital and the quality of patient management
- Principles of resource management; ethics of resource allocation in the face of competing claims to care
- Concept of risk: benefit ratio and cost effectiveness of therapies
- Principles of health economics, departmental budgeting, financial management and preparation of a business plan
- Principles of workforce planning
- Practical application of equal opportunities legislation

SKILLS

- Lead, delegate and supervise others appropriately according to experience and role
- Respect, acknowledge & encourage the work of others
- Listen effectively
- Collaborate with other team members to achieve common goals
- Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
- Demonstrate initiative in problem solving
- Propose realistic initiatives / projects to promote improvement
- Contribute to departmental / ICU activities
- Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
- Assemble clinical and laboratory data, logically compare all potential solutions to the patient's problems, prioritise them and establish a clinical management plan
- Confirm accuracy of clinical information provided by members of the health care team

- Consider risk-benefit and cost-benefit of alternative drugs & therapies
- Consider potential interactions when prescribing drugs & therapies
- Establish a management plan based on clinical and laboratory information
- Awareness of relevant guidelines and consensus statements and apply these effectively in every day practice under local conditions
- Implement and evaluate protocols and guidelines
- Use a systematic approach to locate, appraise, and assimilate evidence from scientific studies relevant to a patient's health problem
- Use electronic retrieval tools (e.g. PubMed and Uptodate) to access information from the medical & scientific literature
- Recognise the need for clinical audit and quality improvement activities to be non-threatening and nonpunitive to individuals
- Participate in the processes of clinical audit, peer review and continuing medical education
- Manage resistance to change in the ICU / hospital environment in order to optimize the outcome of a task
- Record relevant clinical information accurately
- Professional and reassuring approach - generates confidence and trust in patients and their relatives
- Organise multidisciplinary care for groups of patients in the ICU
- Plan long-term multidisciplinary care for patients in the ICU
- Identify members of the health care team which require representation at a case conference
- Timely organisation - liaise with members of the health care team to identify a suitable time and place for a case conference to maximise attendance
- Identify necessary notes / investigations to support discussion during a case conference
- Summarise a case history
- Accept personal responsibility for the prevention of cross infection and self-infection
- Demonstrate routine application of infection control practices to all patients, particularly hand washing between patient contacts
- Use protective clothing (gloves / mask / gown / drapes) as indicated
- Apply methods to prevent autogenous infection (e.g. posture, mouth hygiene)
- Implement prophylactic regimens appropriately
- Maximise safety in everyday practice

- Prescribe antibiotics safely and appropriately
- Demonstrate an interest in quality control, audit and reflective practice
- Seek expert help to ensure all equipment in the ICU conforms with the relevant safety standard
- Monitor complications of critical illness
- Document adverse incidents in a timely, detailed and appropriate manner
- Inform colleagues, patients and relatives as applicable, of medical errors or adverse events in an honest and appropriate manner

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor
    - Consultant feedback on management and leadership skills
    - Involvement in organisational, administrative and committee activities at ICU departmental and hospital levels
    - Consultant feedback on involvement in departmental audit, mortality/morbidity meetings and journal club activities
    - National Patient Safety Conference attendance (College of Anaesthetists of Ireland) – desirable
- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

MEDICAL COUNCIL DOMAINS OF GOOD PROFESSIONAL PRACTICE

- Relating to patients
- Clinical skills
- Professionalism
- Scholarship
- Collaboration and teamwork
- Communication and interpersonal skills
- Management (including self-management)
- Patient safety and quality of patient care

DOMAIN 12: PROFESSIONALISM

LEARNING OBJECTIVES – TRAINEE IS ABLE TO

- *Communicates effectively with patients and relatives.*
- *Communicates effectively with members of the health care team.*
- *Maintains accurate and legible records/documentation.*
- *Respects privacy, dignity, confidentiality and legal constraints on the use of patient data.*
- *Collaborates and consults; promotes team working.*
- *Ensures continuity of care through effective handover of clinical information.*
- *Supports clinical staff outside the PCCU to enable the delivery of effective care.*
- *Appropriately supervises, delegates to others, the delivery of patient care.*

KNOWLEDGE

- Basic ethical principles: autonomy, beneficence, non-maleficence, justice
- Consent and assent in the competent and non-competent patient
- Ethical and legal issues in decision-making for the incompetent patient
- Confidentiality and data protection - legal and ethical issues
- Management of information
- Principles of crisis management, conflict resolution, negotiation and debriefing
- Principles of delivering bad news to patients and families
- Sources of information about different cultural and religious attitudes and beliefs to life threatening illness and death available to health care professionals.

- Impact of occupational and environmental exposures, socio-economic factors, and life style factors on critical illness
- Strategies to communicate to the general population critical care issues and their impact on the maintenance and improvement of health care.
- Principles of adult education and factors that promote learning
- Principles of professional appraisal and constructive feedback
- Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management
- Methods of audit and translating findings into sustained change in practice
- Use of information technology to optimize patient care and life-long learning
- Electronic methods of accessing medical literature
- Identification and critical appraisal of literature; integration of findings into clinical practice
- Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines)
- Principles of applied research and epidemiology necessary to evaluate new guidelines/therapies
- Principles of medical research:
    - Research questions
    - Protocol design
    - Power analysis
    - Data collection and analysis
    - Interpretation of results
    - Manuscript preparation and publication
    - Ethical principles involved in conducting research (including subject protection, consent, confidentiality and competing interests and national ethical approval processes)
- Ethical management of relationships with industry
- Requirements of ICM training at local and national level

SKILLS

- Communicate with patients and relatives - give accurate information and re-iterate to ensure comprehension
- Discuss treatment options with a patient or relatives before ICU admission
- Differentiate competent from incompetent statements by patients
- Communicate effectively with relatives who may be anxious, angry, confused, or litigious
- Obtain consent/assent for treatment, research, autopsy or organ donation
- Use non-verbal communication appropriately
- Use available opportunities and resources to assist in the development of personal communication skills
- Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives
- Acquire, interpret, synthesize, record, and communicate (written and verbal) clinical information
- Involve patients in decisions about their care and treatment
- Professional and reassuring approach - generates confidence and trust in patients and their relatives
- Act appropriately as a member or leader of the team (according to skills & experience)
- Lead, delegate and supervise others appropriately according to experience and role
- Communicate effectively with professional colleagues to obtain accurate information and plan care
- Collaborate with other team members to achieve common goals
- Consult and take into account the views of referring clinicians; promote their participation in decision making where appropriate
- Liaise with medical and nursing staff in other departments to ensure optimal communication and continuing care after ICU discharge
- Participate appropriately in educational activities and teaching medical and non-medical members of the health care team
- Contribute to professional meetings - understand their rules, structure and etiquette
- Respect, acknowledge & encourage the work of others
- Take decisions at a level commensurate with experience; accept the consequences of these decisions
- Attentive to detail, punctual, reliable, polite and helpful
- Contribute to departmental / ICU activities
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- Participate in the processes of clinical audit, peer review and continuing medical education
- Propose realistic initiatives / projects to promote improvement
- Utilise personal resources effectively to balance patient care, learning needs, and outside activities.
- Develop, implement and monitor a personal continuing education plan including maintenance of a professional portfolio
- Use learning aids and resources to undertake self-directed learning
- Use electronic retrieval tools to access information from the medical & scientific literature
- Use a systematic approach to locate, appraise, and assimilate evidence from scientific studies relevant to a patient's health problem
- Demonstrate initiative in problem solving
- Maximise safety in everyday practice

METHODS OF LEARNING AND ASSESSMENT

- Formative assessment/Learning:
    - Consultant feedback in the workplace
    - Training supervisor's report from interim competence assessment: feedback discussion between trainee and training supervisor during PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Workplace-based assessments: CbD
    - Entrustable professional activities: rated using CbD
    - Logbook review with training supervisor
    - Involvement in ICU departmental educational, research and audit activities
    - Intensive Care Simulation course (JFICMI) –desirable
    - Medical Council Guide to Professional Conduct and Ethics

- Summative Assessment:
    - Training supervisor's report from end-of-term competence assessment: feedback discussion between trainee and training supervisor and at least one other PCCM consultant at the end of PCCM module (from observation of daily performance by training supervisor and other consultants within the ICU)
    - Logbook review with training supervisor
    - Final "sign-off" meeting between trainee and Training Committee members to ensure all training requirements satisfactorily completed

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